A Report on the Scientific Work of the Surgical Staff of the Woman's Hospital in the State of New York

1919

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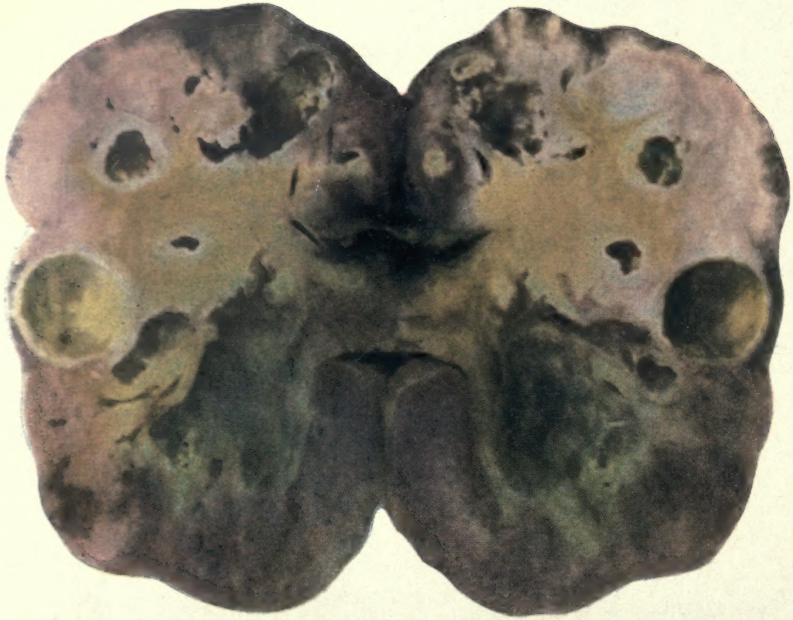

Plate I. Extensive parenchymatous tuberculosis.

Plate II. Arrested tuberculosis.

(The Management of Renal Tuberculosis—H. G. Bugbee.)

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REPORT

OF THE

Scientific Work of the Surgical Staff

OF THE

Woman's Hospital in the State of New York

Edited by GEORGE GRAY WARD, JR., M.D., F.A.C.S.
Chief Surgeon

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VOLUME II
1919

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PREFACE

During the past year a change in the organization of the work of the Woman's Hospital has been inaugurated in accordance with the wishes of the Board of Governors. They have declared for a system of unification of the service with a central control, believing that better results will be accomplished in the more thorough study and care of the patients and in the utilization of the large amount of material that is available for making contributions to medical science, by coördinated efforts under direction rather than by several independent services as formerly.

While standardization and simplification of routine hospital procedures have been established, the individuality and initiative of the members of the attending Staff have not been hampered, and they have been encouraged to utilize to the utmost their ideas in research and technique.

The entire Surgical Staff, including that of the Out-Patient Department, is expected to engage in clinical research in addition to their routine duties, and the results of these various studies during the current year are herewith presented.

The Governors have also recognized the importance of the teaching function of the Hospital and its great value as a stimulus to the Staff. They have wisely fulfilled this duty to the community by opening all the departments of the institution to the undergraduate students of Cornell University, Medical College. In addition to the required work in gynecology, an elective course is given during the last term of the Senior Year which consists of a full time clinical clerkship in the Hospital for one month. As a part of this course, each student is given a clinical research problem to work out, the wards, records, surgical library and laboratories being at his disposal for this purpose, and he is required to submit a thesis on the subject assigned.

Three of these theses have been selected as worthy of publication, as a part of the work of the Hospital, and are appended to the contributions of the Staff.

Our sincere thanks are due to the Board of Governors for their cordial coöperation and generosity which permits of the publication of this Surgical Report.

We desire to acknowledge our indebtedness to the publishers of the AMERICAN JOURNAL OF OBSTETRICS, and to the publishers of SURGERY, GYNECOLOGY AND OBSTETRICS, for numerous courtesies extended.

GEORGE GRAY WARD, JR.

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HOSPITAL STANDARDIZATION AND ITS APPLICATION TO THE ORGANIZATION OF A SPECIAL HOSPITAL.*

BY

GEORGE GRAY WARD, JR., M. D., F. A. C. S.,

Chief Surgeon.

Hospital Standardization.—During the past decade there has been an awakening of the medical profession and of those interested in hospital economics, to the fact that in general our hospitals have not been properly fulfilling their functions in so far as efficiency and conservation of energy are concerned.

In 1913 the Regents of the American College of Surgeons first announced its purpose of taking measures to bring about hospital standardization in order to improve existing conditions and in October, 1917, the first Conference of the International and State Committees on Standards was held in Chicago.

It was the writer's privilege to attend this meeting as a member of the New York Committee. The enlightenment as to the actual facts and the great need for improvement as presented to the Conference, with the enthusiasm and inspiration which were kindled to take part in such constructive work, made the journey and the time spent well worth while.

The chief points brought out were, that the proper care of the patient was held as the test of efficiency in the standardization program, that the hospital is primarily for the patient, for his convalescence and complete recovery from illness, that there was a great need of closer coöperation between hospital staffs and hospital trustees, and that it was necessary to establish a strong administrative authority in order to accomplish results. A Committee was appointed to gather the necessary data concerning the hospitals of the country and to establish a minimum standard of efficiency as a basis for hospital standardization.

We all know what the Carnegie Foundation's Report on "Medical Education in the United States" did to raise the standard of our medical schools. This was the result of publicity. Publicity

* Read before the Hospital Graduates Club, New York, March 28, 1918. Published in the *American Journal of Obstetrics and Diseases of Women and Children*, July, 1918.

as to the present inefficient system of organization and the unbusiness-like methods which prevail in the majority of the hospitals of the country, will accomplish similar results.

Undoubtedly the community is awakening to the fact that having passed through the antiseptic era and the sanitary era, we are now on the threshold of the hospital era. The public are becoming educated rapidly to the advantages and necessity of modern diagnostic methods and to the fact that these can be obtained only in a hospital that is systematically organized to do proper diagnostic work. As a result of this knowledge, there will be a great increase in the number of people who will enter hospitals in the near future because they will appreciate that their cases will receive more thorough, systematic, and scientific study with more perfect results and less expense than if they remained at home. At present in an urban community only about 12 per cent. of the sick, requiring professional care, enter hospitals.

The board of governors, or trustees of a hospital are primarily responsible for the kind of care and treatment that the patient receives, and they should not lose sight of the fact that the hospital which most successfully fulfils its functions is the one which is conducted with the primary ideal of procuring for the patient the best professional care and not from the business standpoint of financial surplus. Hospital governors, as a rule, do not give the same intensive study to their hospital problems as they do to their individual business. They are interested principally in the balance sheet and do not concern themselves as to whether the results of the treatment the patients receive are what they should be.

Because a hospital has large elaborate buildings, with beautiful surroundings and socially prominent trustees, it does not follow that the patients of that hospital receive the skilful treatment which they have a right to expect. As has been well said, many such elaborate institutions are mere boarding houses or hotels for the sick. We all know that a small hospital, situated in the country, may give the highest type of scientific service to its patients. As Hornsby well says, "the product of the hospital is health," and also, "no hospital can be better than its medical staff." We know that it is the character of the medical staff that determines the product of the hospital and the governors or trustees determine the type of the medical staff.

A man who accepts a position on the governing board of a hospital should realize that he accepts a public trust and that hospital trustees stand in the same relation to a hospital as trustees do to a trust

fund. Therefore, they should demand and see that they get efficient results for the money they expend. Their responsibility can only be fulfilled when they have provided a conscientious, efficient medical staff, and a competent, tactful superintendent.

It is the duty of the profession to educate the trustees as to their responsibilities and when we can show them that efficiency in the hospital, just as efficiency in the factory, is an economic problem, they will become interested. Bancroft's statement—"that every cured and satisfied patient leaving the hospital is an asset and every unimproved or dissatisfied patient is a liability"—is just as true in the medical world as its counterpart is in the business world.

The functions of the hospital are threefold. The first and foremost is the care and cure of the patient. The second is educational —teaching nurses, internes, students and the medical profession. The third is to contribute to knowledge by scientific research.

An analysis of conditions under the old order of things shows that these functions have not been carried out with a maximum of efficiency and a minimum of waste of time, energy, and money, largely on account of a divided authority, too large a staff, multiplication of services, and last but not least, a failure to study end results.

The first function of a hospital is the care and cure of the patient. Codman's statement that heretofore there has been no attempt to systematically fix the responsibility for the success or failure of each case treated and that it is the duty of no person or department in most hospitals to investigate the efficiency of treatment, is a truth that makes self-evident the compulsory need of a follow-up system.

The follow-up system is analogous to the Inspector General's Department in the Army, without which it would be impossible for Headquarters to know its condition and efficiency and the result of its training. Undoubtedly the study of end results will be a requirement in the minimum standard of hospital standardization.

The remedy necessary to produce efficiency in the functions of the hospital lies in a study of the methods of systematization and standardization employed by the business man and the large industrial plants as laid down by the efficiency engineers.

The fundamental idea in efficiency is the avoidance of waste. A hospital should perform its functions with the minimum waste of labor, time, materials, money, and opportunity.

The nurses' time and energy are wasted when we compel them to learn a multiplicity of methods of doing the same thing in their work

in the wards, or the operating room, instead of adopting the one best way as a standard procedure.

The time and energy of the internes, doctors, and patients, and the hospital's money may be wasted on account of preventable mistakes due to unbusiness-like methods and lack of system.

Waste occurs due to a failure to coördinate the different departments through a central authority.

Harrington Emerson's fundamental principles of efficiency should be the guide posts of every one who has to do with hospital management. They are: (1) clearly defined ideals; (2) common sense; (3) competent counsel; (4) discipline; (5) the fair deal; (6) reliable, immediate, and adequate records; (7) despatching; (8) standards and schedules; (9) standardized conditions; (10) standardized operations; (11) written standard practice instructions; (12) efficiency reward.

The annual report which shows the number of patients treated and the number of operations performed may indicate the volume of work done, but it does not show the character of the work done or the results obtained. As we well know the term "recovered" too often means recovered from the operation and not recovered from the disease.

The fundamental principle in the organization of a hospital service should be its *unification* with a central control instead of multiple independent services, in order that there may be a complete coördination of all departments with proper team work on the part of the staff. It is true that this requires the subordination of the individual to the welfare of the service, which means that the welfare of the patient is the prime consideration and not the personal interests of the physicians.

To insure a proper development of system and standardization, it is essential that there must be a permanent directing head with the necessary powers. Only in this way can questions of authority and prerogative be eliminated. As the captain of a ship insures a smoother, safer, and more economical voyage than if she were under the guidance of a committee of Bolsheviki, so a director, or chief, will insure a more efficient performance of the functions of the hospital with a minimum of expenditure than if they were dependent upon the individual wishes of a multiple staff of equal rank. The service of the chief should be continuous so that but one policy prevails at all times and the responsibility is centralized.

Limitation of the number of staff appointments to the actual requirements of the service is essential, as a distinctly higher grade of surgery can be achieved. The smaller the staff, the more expert

and higher the grade of work will be. Services with large staffs generally fail to develop great ability.

The unification of the service implies that there is "one patient and one doctor." The care of the patient by the hospital should be coördinated and continuous from the time she comes to the out-patient department, when she enters the hospital for further diagnostic study in the wards, and special departments, and for operation or treatment, until she returns to the follow-up clinic and is in the care of the social service department.

Throughout her connection with the hospital she should be "one patient" in all the departments with the same number, and the records of her case should be consolidated so that it is possible to find in one place her continuous and complete medical history.

Her case should be studied and treated as if by one doctor, that is by one clinic, and not separately and independently by each department without relation or coördination.

The out-patient surgeon should have every facility to follow the case into the wards and operating room and in the return clinic. Only in that way can he expect to obtain the full benefit of his service. This necessitates a close coöperation between the out-patient department and the hospital wards.

How often is it that a case has been studied in the dispensary for a considerable period of time, perhaps time consuming laboratory tests and cystoscopic work has been done, expensive *x*-ray photographs have been made, yet no record of the same or statement as to the treatment and progress of the case while in the dispensary is transmitted to the ward with her for the guidance of the attending staff. The whole work is duplicated at a considerable waste of time, energy, and money, because the patient is treated as a new case and not as an old one, as if the out-patient department had no connection with the hospital whatever.

Every patient on entering the ward from the out-patient department should have sent with her a record of her case while in that department, which should be the first sheet of her hospital history.

On entering the hospital each case should be studied carefully and thoroughly in order that an accurate and complete diagnosis may be made, rather than a "snap diagnosis" as is so often the custom. A needless operation for the removal of a normal appendix instead of a ureteral calculus will not then be so frequent. The modern complicated methods of diagnosis make a systematized method of procedure necessary in order that the various laboratory tests, cysto-

scopic, and *x*-ray work when indicated, may be employed, and all the data essential to a complete diagnosis assembled.

This routine system of examination of all cases necessitates that the patient stay in the hospital for several days prior to operation, except in emergencies. This is greatly to her benefit as she can then be brought to operation in a far better condition to stand the ordeal, than if subjected to hurried preparation, and with far less chance of an error in diagnosis having been made. Many hard working, worn out women, with gynecological complaints need the few days rest in bed almost as much as the operation, and they will make a speedier and safer convalescence as a result.

The special assignment of certain types of cases to the men of the staff in accordance with their particular interest will tend to promote scientific progress, but they should be given to understand that a study is expected to be made of this material and their results and conclusions are to be made available for publication.

Professional promotion should be dependent on efficiency and not on seniority, and the efficiency should be gauged by the thoroughness and completeness with which the work is done.

The things we do in a hospital and the things we use in a hospital should be standardized on a basis of simplicity and efficiency.

Dickinson states that in a Brooklyn hospital there are six different ways of giving an enema. Is there not one best way, and if so, what is it?

The standing orders in the wards for preoperative and post-operative care should be standardized and made as simple as is compatable with common sense, and these orders should be written in such form as to be available to nurses, internes, or students. *One set* of standing orders means a saving of time and energy for the internes and nurses, and reduces the chance of error to a minimum with resulting benefit to the patient and economy for the hospital.

The instruments in the operating rooms should also be standardized and simplified. This again reacts to the benefit of patients, surgeons, nurses and the hospital. A standard set of instruments required for each class of operative procedure should be determined on and the operating-room nurse should have lists of the same, so that there will be an avoidance of wear and tear on a great number of unneeded instruments which have been unnecessarily prepared, and the nurses will be able to get through their work at a reasonable hour.

The technic of the operating room should be standardized. In

no other way can smooth and rapid surgery be accomplished with the minimum chance of error.

Codman's statement is very true, "that no amount of material will make a good operator a good surgeon unless he takes a proportionate time to study pathologic conditions and follow his cases so that he may know whether his operations were appropriate as well as beautiful."

This requires a system of recording case histories that will make the material readily available for the study of the various types of cases, and a follow-up system that insures the postoperative study in the return clinic by the operator *in person*, and not by his assistants, of every patient he has operated upon. The advantages to the surgeon and to his future patients cannot be overestimated.

The value of the records of a hospital would be greatly augmented if the histories of the private patients were properly recorded.

The end-result system of Codman requires that the records of every hospital should answer the questions:

What was the matter with the patient?

What did the doctor do to him?

What was the result?

If the result was not good, what was the reason?

Was it the fault of the doctor, the patient, the disease, or the hospital organization or equipment?

His uniform end-result card accomplishes this purpose and should be part of the case histories in every hospital, in order that all may know the kind of product the hospital is producing.

The social service department which has such an important humanitarian function and is an essential part of every metropolitan hospital should be in close touch with the attending staff as well as with the patients. This is frequently not so and is usually the fault of the staff.

The second function of a hospital is that of teaching—teaching nurses, internes, students, and the profession at large. Unless a hospital is a teaching center it does not fulfil all its functions or its duty to its patients or the community, and cannot prosper as a scientific institution. A hospital having a university connection is fortunate, as the standard of work in that hospital will inevitably be raised, although a university connection is by no means essential. No small measure of success of the Mayo's is due to the fact that theirs has always been a teaching clinic although not affiliated with a university until recently, meeting rooms, library, conferences and a welcome to the operative clinics being provided gratuitously for

visitors. Teaching is the great stimulus to do better work and its rewards are proportionate to the effort expended.

The teaching of internes is an important obligation of the attending staff that is too frequently without thought or system. As some one has said, the interne has to gather up the crumbs from the rich man's table, chiefly the operating table, as best he may. His work should be helpfully supervised, and he should be instructed as if still an undergraduate. He should be encouraged to make independent diagnoses, and to seek light from the literature bearing on his cases, and his imagination should be stimulated by giving him practical research problems to work out. He should clearly understand that what operations he might be allowed to do under supervision, would be as an efficiency reward, and directly proportionate to his faithful and conscientious performance of his duties, and not as his right.

The thorough clinical training of our medical students necessitates that they work in the wards of the hospital, as part-time or full-time clinical clerks.

This is a new departure for this country but has been long established in the hospitals abroad. Trustees should realize that instead of being detrimental to the best interests of the patients, it is the reverse, for while these patients assist in the advancement of science and education, they at the same time become the recipients of more thorough, careful, scientific study and treatment than they could receive otherwise.

The third function of the hospital is the advancement of science, and as clinical research can only be done in the hospital, the obligation to humanity is obvious. The attending staff, seniors and juniors, should be engaged on problems of clinical research as part of their daily duty as well as attending to their routine work, or they will be allowing precious opportunities for the advancement of science to slip by, and they will be unworthily occupying space that can be better filled by more capable men.

Periodical conferences of the entire attending staff should be held in order that the members and the chief may exchange ideas, discuss their problems, check up the results, and investigate errors. This brings the men in personal touch with each other's work and develops team work which unifies the service. The educational value of such conferences is unquestionable.

Every hospital ought to have an adequate medical library, with American and foreign scientific journals on file for the use of the staff, the internes and the students.

The consulting staff of a hospital should be *active*, and not one that regards its obligations as purely honorary. It should contain specialists, who should be available for consultation as often as necessary. The need of a gastroenterologist and a pediatrician for such daily service in a gynecological and obstetrical hospital is obvious.

A physician referring a patient to the hospital should have the courtesy of an invitation to the operation and the patient should be referred back to him with a copy of the diagnosis. By so doing the hospital would be fulfilling one of its functions of educating the profession.

An intelligent and polite information service in the hospital office is a good investment for every hospital. It is the exception rather then the rule.

The Organization of a Special Hospital.—The science of medicine has become so complex with the discovery of new truths, and the requirements of modern diagnostic methods and treatments, that specialization is per force an inevitable necessity, and so long as we have special fields in medicine and specialists, so must we have special departments in hospitals and special hospitals. The sister specialties of obstetrics and gynecology are interdependent, and neither one can be obliterated, in spite of the wishes of the general surgeon. As long as women continue to bear children the specialty of obstetrics cannot die, and until we reach the Utopian age of anatomical and physiological perfection, we will have reconstructive surgery to do on the female genitalia as a result of child-bearing. As about 60 per cent. of gynecological surgery is of this type and as a knowledge of obstetrics is an immense advantage, if not an actual necessity, to the man doing plastic gynecology the general surgeon, on account of his lack of interest in obstetrics is not well qualified, as a rule, to do the reconstructive surgery of women. His results frequently show that he has no knowledge of its relation to future parturition. How often will he remove a neoplasm in the abdomen and neglect a prolapsed bladder or a gaping pelvic floor in the same case.

In 1855 Marion Sims showed the crying need of a special hospital for the treatment of diseases and injuries peculiar to women, and as a result of his efforts the Woman's Hospital of this city was founded by women for the exclusive use of women, as the pioneer in this specialty in the whole world, and it has continued to flourish ever since. A recent study made by Dickinson shows that in this city 24½ per cent. of all the surgery is gynecological, while but 8 per

cent. is urological. That there is a need for gynecological hospitals to-day, as well as in the days of Sims, is evident.

The Woman's Hospital was opened at 83 Madison Avenue in 1855 with a staff of one attending surgeon, J. Marion Sims, and two "matrons," one to attend to the domestic concerns, and the other to administer to the sick, with one "nurse" as a helper.

The hospital contained forty beds and during the first year, sixty patients were received, of which twenty-one were discharged as perfectly cured. Of those remaining in the hospital at the end of the year all were pronounced curable except one. An out-patient department had also treated an equal number. The expenses of the first year amounted to $8000.

The annual report states, "From the far West and the extreme South patients have journeyed patiently to this promised haven of relief. Nor have they in any one case been disappointed. Released from suffering, restored again to vigor and health, they have returned to their distant homes to tell other despairing sufferers of the mercies and blessings of the Woman's Hospital."

These were the days when vesicovaginal fistula was so common, and until Sims placed its cure on a certain foundation, there was no relief for these sufferers. In 1867 a new hospital of 100 beds was opened at Forty-ninth Street and Lexington Avenue, and an equal addition in 1879. In 1906 the present magnificent structure at 109th and 110th Streets and Amsterdam Avenue was occupied. The hospital early became the center from whence gynecic knowledge radiated to all parts of the scientific world, and it has exerted a marked influence in developing and establishing gynecology as a specialty.

The present hospital consists of 106 gynecological and twenty-five obstetrical ward beds, and seventy-three private and semiprivate beds, a total of 204 beds. During the past year there were 3721 patients admitted and 5119 operations performed and 613 births. The Out-Patient Department had 9180 applicants and 14,370 visits.

The total operating expenses of the hospital were $284,496.27. The number of employees, including the nursing staff, is 212. The social service department has a staff of five paid workers and three volunteer workers, and it is the connecting link between the departments of obstetrics and gynecology in coördinating their work.

The organization of the service was a multiple one, there being five gynecological services and one obstetrical. At one time there were as many as six gynecological services. Each service was practically independent and each head had the power of nominating his assistants in the hospital and out-patient department.

Until recently the surgical department consisted of thirty-three men, one a surgical director, not on the active service, twenty on the attending staff and special departments, and 12 in the out-patient department.

The Woman's Hospital is fortunate in having a well-informed board of governors, who realizing their responsibilities have seriously

studied the hospital problem as it presents itself to-day, and who have appreciated the modern trend toward standardization on scientific efficiency methods. They have declared for a system of unification of the service with a chief surgeon with ample powers, in order that there may be a standardization and simplification of procedure throughout the hospital in all departments, with a centralization of responsibility.

Furthermore, appreciating the importance of teaching to the progress of a hospital, they have thrown open their doors and welcomed undergraduate students as full-time clinical clerks throughout the institution. As a result, the present organization consists of but one service which is continuous and under the entire control of the chief surgeon. This is subdivided into a gynecological, obstetrical, and an out-patient department, and the special departments of pathology, electrotherapeutics, cystoscopy, and radiography. An efficient historical department under a historian who has charge of the records, and a follow-up and social service system complete the organization.

The attending staff now consists of the chief surgeon, and four attending surgeons on duty, one of whom is the obstetric surgeon, and five junior attending surgeons. Each of the special departments has a head with the necessary assistants.

The entire staff are subordinate to the chief surgeon, who has the power of making all nominations in all departments. He assigns the clinical material as he thinks best and he may use the same for teaching purposes.

All the patients who enter the wards of the hospital from the out-patient department, or by reference, are assigned to the attending surgeons in rotation for diagnostic study, and a report to the chief surgeon of the provisional diagnosis must be made within forty-eight hours. The material is then reassigned to the staff for operation or treatment, in accordance with their particular interest, if deemed advisable.

Each patient who is admitted from the out-patient department is accompanied with a reference sheet, which becomes the first sheet of the hospital history, for the guidance of the attending staff. This contains all the data relating to the case while in the care of the O.P.D. including the physical findings and tentative diagnosis as made by the surgeon in charge of the clinic. The requiring of the out-patient surgeons to record their findings on this reference sheet is a valuable aid to the chief surgeon in judging of the ability and progress of the junior men.

Standardization and simplification of standing orders, methods, instruments, operative technic, etc., are being gradually instituted. Each operating surgeon has a follow-up return clinic once a week which he must attend in person and examine all the returning patients which have been under his care, and dictate to a stenographer the present status of the case for permanent record in the history.

A weekly conference of the entire Surgical Staff is held in the laboratory lecture room at which the pathologists demonstrate the gross specimens and microscopical sections of the pathological material obtained from the service during the past week. A report of the follow-up clinic and the casualties of the service is called for from each attending surgeon during which the deaths, complications, infections, obscure diagnoses, diagnostic errors, and postoperative results are discussed by the staff. One of the junior members of the staff makes a report of the recent gynecological and obstetrical literature or reports the points of interest at some operative clinic he has been requested to visit. A report of cases of special interest is made by one of the attending surgeons in turn. This weekly conference is open to the medical public

The plan of the house staff has been reorganized to accord with the unified service and central control. It will consist of a paid resident gynecologist, who is in control of the entire interne staff, and responsible for their discipline and work, a paid resident obstetrician, and two house surgeons, each with a senior and junior assistant. The service of the paid residents is indeterminate and continues as long as their work is satisfactory. They will be given larger responsibilities than the ordinary internes and will be encouraged to utilize their opportunities for research work and to publish their results in the Surgical Year Book.

The regular interne service is for one year. Four months as junior assistant, two months of which is spent in the obstetrical department, as we believe a man will do better gynecological work if he has obstetrical training, four months as senior assistant, ans four months as house surgeon, after which he becomes eligible for a paid resident's position if he so desires.

The teaching of undergraduate students from the Cornell University Medical College as carried out at present is as follows:

The senior class in the fourth year, during the last three months of their course, spend their time entirely in elective studies. The elective course in Gynecology which we give at the Woman's Hospital provided for a group of four students working as clinical clerks from 9 A. M. to 5 P. M. daily for one month. The work is divided into two schedules. Each section of two students completes a schedule in two weeks when the sections exchange schedules. A new group starts each month.

It will be seen that in a month's course of intensive all-day training in every department of such a special hospital during which the student works in the wards, observes and assists in the operating rooms, laboratory, out-patient and special departments, entirely under supervision, that he has exceptional opportunities to obtain practical training and knowledge. The use of clay modeling and the stereomotograph to illustrate anatomy and technic are employed in the operating room to elucidate the work and to keep up the students' interest. They are given problems to work up in the study hours, being taught how to utilize the record room for the abstraction of observed facts from the hospital histories in various types of cases.

SECTION A. (2 Students for 2 Weeks.)

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9–10 Out Patient Dept.	9–11 Path. Labt.	9–11 Out Patient Dept.	9–11 Path. Labt.	9–12 Oper. Class	9–10 Out Patient Dept.
10–12 Follow up Clinic					10–11 Conference with the Chief Surgeon
12–1 Study	11–12:30 Cystoscopic Clinic	11–1 Study	11–12:30 Cystoscopic Clinic	12–1 Study	12–1 Study
INTERMISSION.					
2–4 Oper. Class	2–5 Oper. Class	2–4 Oper. Class	2–3 Out Patient Dept.	2–5 Oper. Class	2–3 Out Patient Dept.
4–5 Path. Labt.		4–5 Path. Labt.	4–5 Path. Labt.		
			5– Conference Surgical Staff		

SECTION B. (2 Students for 2 Weeks.)

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9–1 Wards	9–1 Wards	9–1 Wards	9–1 Wards	9–1 Wards	9–10 Wards
					10–11 Conference with the Chief Surgeon
					12–1 Study
INTERMISSION.					
2–4 Oper. Class	2–5 Oper. Class	2–4 Oper. Class	2–4 Study	2–5 Oper. Class	
4–5 Path. Labt.		4–5 Path. Labt.	4–5 Path. Labt.		
			5– Conference Surgical Staff		

What of the future of the hospital and the proper fulfilment of its functions?

With a magnificent and costly plant, fully equipped by a generous and enlightened board of governors, who are endeavoring to place the organization of the staff and the service on a basis in accord with the most modern theories of hospital standardization and efficiency, the opportunity for the future development of ideals is assured, and it is clearly the obligation of the surgical staff to produce results that will be worthy of the great heritage which they have received. This means that, as time goes on, the surgical staff must be constantly recruited with new blood, with men of ability and

knowledge, sufficient to worthily uphold and maintain the reputation of the past.

Such men can rarely be found ready made. We must appreciate that our duty and opportunity lies in systematically training and making such men out of the young graduates just entering the profession, instead of hunting for a man some one else has trained.

The responsibilities and labor that such a plan of organization entails upon the Chief Surgeon or Director, are very great.

In these days of large and complex organizations it is not possible for one man to stand alone by individual achievement and to bear the burden without the help of those around him. He must have that type of loyalty and of harmonious coöperation in which each member of the staff performs the function for which he is best suited, without the loss of his individuality and initiative, although his efforts are controlled and coördinated for the best interests of the institution.

THE STATUS OF UTERINE CURETTAGE BASED ON HOSPITAL RECORDS.*

BY

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A VAGINAL discharge other than a moderate periodical bloody flow has always been recognized as significant of uterine disease. The Egyptians(1), 1600 years before Christ, treated this condition with the peppermint vaginal douche, intrauterine medicated pessaries and vaginal and interuterine fumigations. To-day often the first and too often the ultimate treatment of this symptom is divulsion and curettage. As a therapeutic measure divulsion of the cervix antedates curetment of the uterine cavity by many centuries. In the work attributed to Hippocrates(1), born 460 years before Christ, is described the use of graduated cervical sounds made of pine-wood, tin, and lead and the use of raw-flax tents. Soranus(1), who wrote in the first century, advocated in obstetrics the use of the finger for cervical dilatation and mentions digital curettage in a septic puerperal uterus. Metal dilators for obstetric use that separate after introduction were first described in the twelfth century by Albucasius(1). The uterine curet was invented by Recaimier(2) in the middle of the nineteenth century, and his instrument was later modified by Simpson, Simon and Sims(3). The latter in 1865 presented before the London Obstetrical Society a short paper entitled "On a New Form of Curet for the Removal of Uterine Fungoid Granulations." The Sims' curet was still further modified by Thomas with his dull curet and by Emmet with his curet forceps. Emmet(4) says, "As regards the instrument of Dr. Sims, I honestly believe that the ingenuity of man has never devised one more capable of doing more injury." This statement

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seems extreme but we well know the pendulum has swung too far and curettage is now often done for the slightest indication and sometimes as a cure-all in gynecology. Therefore it seems wise to take stock and from the records of the Woman's Hospital to establish the status of uterine curettage.

From an examination of Table I we find that at the Woman's Hospital in the last eleven years, 1908 to 1918 inclusive, 20,011 patients have been treated and 36,029 operations performed of which 6219 were divulsion and curettage. Thus 31.07 per cent. of the patients had and 17.26 per cent. of the operations performed were divulsion and curettage. Further we find that the number of patients who had this operation has gradually decreased from 60.31 per cent. in 1908 to 26.76 per cent. in 1918 and even to 24.79 per cent. in 1916. Likewise the number of cases of divulsion and curettage compared with the total number of operations has decreased from 43.17 per cent. in 1908 to 14.39 per cent. in 1918, and even to 12.33 per cent. in 1917. The percentages for this operation seem high and a number of them must have been done as a matter of routine or for indications based on insufficient clinical study of the cases. To prove or disprove this statement the case records for the year 1916 have been studied and show that 336 or 26.48 per cent. of the 1269 gynecological ward cases operated upon had a divulsion and curettage either alone or combined with other measures. The result of this study is shown in Table II.

The most striking facts are: First, in 182 or 54.17 per cent. of the cases cureted the operator failed to obtain sufficient material for microscopical diagnosis or failed to save what was obtained. Of the 336 cases there were 159 or 47.32 per cent. in which no specimen was saved by the operator. From this fact we must conclude, as the rule of the hospital is to have all tissue sent to the laboratory for examination, that the operator considered a macroscopic examination sufficient. Therefore in 54.17 per cent. the curettage was exploratory or a routine procedure. Second: In nineteen cases or 5.65 per cent. there is no pathological record of the curetings. In nine the operator states the specimen was sent to the laboratory and in ten there is only a record of other tissue removed at the same time. This fact together with the evidence in two cases not included in the above that the specimen was lost, may account for the absence of a pathological report in some of the above-mentioned cases. Third: Only 134 or 39.5 per cent. of the curetings were examined microscopically and 94 or 70.1 per cent. showed normal endometrium. In 27 or 20.5 per cent. there was hyperplasia and in 13 or 9.4 per cent. there was

interstitial change. These percentages seem unduly high and I believe a more accurate figure would be obtained if we added to the 134 cases actually examined those cases in which blood clot or insufficient material for microscopic examination was obtained and also those cases in which the operator failed to save what was obtained. This would give us a total number of 316 cases with hyperplasia in 8.5 per cent. and interstitial changes in 4.11 per cent. Even these figures may be high because of the small number of cases in our series or Kelly(5) reports in 1800 cases an examination of the endometrium showed definite inflammatory changes exclusive of tuberculosis in forty-nine cases or 2.7 per cent.

As the total number of cases for 1916 showing endometrial changes, was so small I then reviewed all ward cases for 1917 and 1918 showing endometrial change. For the three years there were 123 cases with hyperplasia in seventy-five and interstitial changes in forty-eight. In Table III these cases are arranged to show the gynecological conditions in which they occurred. A review of this table gives twenty-one cases of abdominal section: sixteen showing hyperplastic changes (in cases of retroversion of the uterus simple or complicated by adnexal changes) and five interstitial changes all occurring in cases of salpingitis. In twenty-one cases of combined abdominal and plastic operations fourteen showed hyperplastic changes and were found in retrodisplacements of the uterus with associated adnexal disease and lacerations of the cervix and pelvic floor, and seven showed interstitial changes and were found in cases of retroversion with laceration of the cervix or plevic floor. In two cases of vaginal and plastic operations for prolapsus and lacerated cervix and pelvic floor, both showed interstitial changes and in twenty-three plastic operations there were hyperplastic changes in sixteen and interstitial changes in seven.

In fifty-six cases which were only divulsed and curetted because of menstrual disturbance or for anteflexion or sterility, there were twenty-nine which showed hyperplastic changes (ten with metrorrhagia as the chief symptom) and twenty-seven with interstitial changes (fifteen with metrorrhagia as a prominent symptom).

A further study of the forty-eight cases showing interstitial changes, shows in seventeen or 35.42 per cent. a history of early abortion within a period of a few days to a year and in some there was an infection resulting; and one of these cases was an acknowledged criminal abortion. In three other cases the patients dated their symptoms from a confinement which had occurred within one to nine months. Thus there were postpuerperal conditions in

41.67 per cent. of the cases of interstitial changes. Of the remaining twenty-eight cases there was a lacerated cervix in six; polypus in two; inflammation of the tubes in five; and cellulitis in one. Thus 70.83 per cent. of the cases showing interstitial changes gave clinical evidence of abortion, postpuerperal changes, cervical laceration or polypus or inflammation in the tubes or the tissues adjacent to the uterus.

Sequelæ.—In our series there are 110 cases of divulsion and curettage and in twenty-four of these an intrauterine stem was also introduced. In only six cases or 5.5 per cent. was there a postoperative elevation of the temperature above 101.2° F. or of the pulse above 100 even though two of the cases had a temperature before operation. These were cases with interstitial changes and histories of recent abortions. In one the preoperative temperature had been as high as 103° F. and in the other 102.2° F. The postoperative temperature in the former only reached 100.4 °F. and in the latter only 99° F. The six cases showing a postoperative reaction were the following:

Case I.—The temperature rose the first day to 101.8° F. and the pulse to 88. The patient was curetted because of symptoms of menorrhagia, dysmenorrhagia and a severe leukorrhea. This reaction was evidently due to lymphatic absorption of infection introduced from the cervix by the curet.

Case II.—Forty-eight years of age with slight symptoms of the menopause and metrorrhagia. Insufficient material for microscopic examination was obtained but by means of the curet a diagnosis was made of small submucous fibroids. The temperature rose to 102° F. the second day but in twelve hours it came to normal. The reaction here was probably due to interference with the blood supply of the fibroids and a slight resulting necrosis.

Case III.—Had a history of six weeks amenorrhea followed by a two weeks metrorrhagia. The curet removed only in terval mucosa yet the temperature ranged around 101° to 101.6° the first three days.

In Cases IV and V the curettage was an exploratory or diagnostic procedure and later the former case was found to be suffering from a bacillus coli pyelitis and the latter from a pyelonephritis in addition to an interstitial endometritis. The postoperative temperatures in both of these cases were unquestionably due to the existing kidney conditions although the curettage may have caused an acute exacerbation of these lesions.

Case VI was the only one in the series which caused sufficient sequelæ to necessitate an abdominal section. This may have been the case in others but not observed as the average case of curettage remains in the hospital but a week and the symptoms in

this case did not develop until the tenth day after operation. I shall give the case somewhat in detail as it is an example, in my opinion, of the commonest sequela of curettage. Especially is this the case in the hands of the casual operator or one of only average diagnostic ability.

CASE VI.—Admitted with normal temperature, pulse and respiration, complaining of pain in the lower part of abdomen, worse postmenstrual and recurring for past three months. At times so severe as to cause patient to double up because of the pain. There is also a history of severe profuse leukorrhea, severe and frequent frontal headache, and at times there were chills. Three days after admission, an ether examination failed to reveal adnexal disease and patient was divulsed and curetted and only interval uterine mucosa was obtained. Highest postoperative temperature 99.4° and patient out of bed the ninth day. The afternoon of the tenth day, temperature rose to 100° F. and the afternoon of the eleventh day to 101.6° F. and patient complained of severe pain in abdomen. The temperature remained high until the thirteenth day and there were acute exacerbations the seventeenth, twenty-third, and twenty-fifth days. On the twenty-sixth day an abdominal section, a right salpingectomy, left salpingo-oöphorectomy and appendectomy were done. The pathological examination showed double chronic salpingitis. Evidently this was the condition that had been causing the symptoms but was quiescent and the curettage caused an acute exacerbation.

Diagnostic Value of Curettage.—For three years, 1916 to 1918, there were treated at the Woman's Hospital thirty-nine cases of corpus carcinoma and in four the condition was inoperable. In twenty-seven or 69.23 per cent. no curettage was done as the condition warranted a hysterectomy even if carcinoma was not always suspected. Of eight or 20.51 per cent. of the cases curetted there were five in which the curetings were obtained at the time of the hysterectomy and were only of macroscopic diagnostic value. In another of these cases a curettage only was done as the patient took the anesthesia badly and a subsequent microscopic examination of the curetings confirmed the preoperative diagnosis. In only two or 5.13 per cent. of the cases was the curettage of diagnostic value and determined a hysterectomy at a later date. These cases are as follows:

CASE I.—Fifty-eight years of age with just one menstrual flow in three years and for three or four months a reddish-brown vaginal discharge. Examination under anesthesia revealed a small hard fundus and slightly eroded cervix. Microscopic examination of the curetings showed Adenoma destruens uteri. Nine days later a complete hysterectomy and a microscopic examination of the uterus showed Adenocarcinoma corporis uteri incipiens.

CASE II.—Sixty-three years of age, menopause seven years ago—for one week slight abdominal pain and a show of blood with a moderate yellow watery leukorrhea worse after exercise. Pathological examination of the curetings showed complete necrosis of intrauterine tissue with alveoli arrangement of necrotic masses. A panhysterosalpingo-oöphorectomy was done and a further examination showed carcinoma in polypo uteri with extraordinary stroma changes. It seems that in these two cases a diagnosis of carcinoma might have been made on the history and a hysterectomy was the operation of choice.

The unreliability of an examination of the curetings as an aid to the diagnosis in cases of ectopic gestation is illustrated in the following:

CASE I.—A young woman married ten months with a metrorrhagia for four weeks. Examination under an anesthetic was negative, examination of the curetings showed chronic interstitial endometritis. Two weeks later, from a second curettage, no débris was obtained but abdominal section revealed a right unruptured tubal gestation 4 by 2 cm.

CASE II.—Twenty-nine years of age, married six months, metrorrhagia with pain in hypogastrium and nausea and vomiting. Examination of curetings showed decidua compacta uteri graviditatis or dysmenorrhea membranticia. Five weeks later abdominal section revealed a right ruptured tubal gestation.

CASE III.—Seven weeks amenorrhea with spotting. Curetings showed only the interval phase of the endometrium but abdominal section revealed a right ruptured tubal gestation.

The following case illustrates the importance of curettage in certain cases. Patient entered hospital with history that when two months pregnant she began to flow and has flowed slightly for the past few weeks. She also was suffering from an inguinal abscess. She was curetted and the abscess incised. The curetings showed chorioepithelioma and fifteen days later a second curettage showed only hyperplasia of the uterine mucosa.

It would be most interesting to report in this paper final end-results, but it was found impossible to do this in any considerable number of cases. Therefore I report the following early end-results which illustrate the uselessness of curettage in, and the necessity of a thorough study of, our cases of metrorrhagia and menorrhagia.

CASE I.—Miss S., seventeen years of age, first menses at thirteen years. Regular until last six months, 7-day flow and four napkins a day. For past six months menorrhagia and last menstruation continued twenty-five days. Curetings showed the premenstrual

phase of the endometrium. Patient readmitted seven months later with the history that following the curettage she menstruated normally for two months. Then amenorrhea for three months followed by menorrhagia for the past thirty days. A second curettage obtained only a small amount of débris but relieved the flowing. Three months later she was admitted to the hospital a third time stating that menstruation had been regular until three weeks before and had been flowing with only a five-day interval in this time. This continued nineteen days afterward although she was given thyroid extract, calcium lactate, ergot, and rabbit's serum. However, flow gradually diminished and patient was discharged one week later. Two or three months later she again returned to the clinic with recurrence of her symptoms and was advised to take Radium treatment, and since that time patient has passed from observation.

CASE II.—Mrs. L., twenty-three years of age, married six months. Menses began at twelve years, always irregular, flow seven days, moderate in amount. Since marriage has been flowing constantly with increase of amount at times for regular periods. For two weeks has passed clots but without pain. There was no nausea or vomiting or history of fever or chills. Curetings showed only interval uterine mucosa. About four months later, readmitted, she said following operation there was amenorrhea for seven weeks and then had a flow, profuse for six days and then scant for six days. Five weeks later started to flow again and has continued for one month. Recurettage again only showed interval uterine mucosa.

TABLE I.—Statistics for eleven years (1908 to 1918 inclusive): Number of patients, operations, and divulsion and curettage with percentages of divulsion and curettage compared with number of patients and with other operations performed.

Year	Number of patients	Number of operations	Number of D. and C.	Per cent. of D. and C. to patients	Per cent. of D. and C. to other operations
1908	907	1,267	547	60.31	43.17
1909	1,149	1,745	540	46.99	30.94
1910	1,398	1,839	384	27.47	20.88
1911	1,595	3,172	600	37.62	18.92
1912	2,003	3,600	571	28.51	15.86
1913	2,064	4,169	668	32.36	16.02
1914	1,987	3,527	562	28.29	15.93
1915	2,011	3,728	556	27.65	14.91
1916	2,239	3,658	555	24.79	15.17
1917	2,390	5,119	631	26.40	12.33
1918	2,268	4,205	605	26.76	14.39
Total for 11 years	20,011	36,029	6,219	31.07	17.26

TABLE II.—From October 1, 1915 to October 1, 1916 (Hospital No. 14934 to 17067) in 1269 gynecological ward cases (exclusive of incomplete and therapeutic abortions) 336 or 26.48 per cent. were subjected to divulsion and curettage alone or combined with other operations.

Operations or indications for operation	Curetings not examined						Curetings examined		
	Number of D. and C.	Not saved	None obtained	Blood clot or insufficient	Lost	Not recorded	Menstrual phase	Hyperplasia	Endometritis
Abdominal and abdominal and plastic	177	102	4	2	1	13	43	10	12
Menstrual disturbance, sterility, anteflexion, leukorrhea, etc.	93	27	2	7	1	3	33	11	9
Plastic	60	27	..	7	..	2	16	6	2
Vaginal and plastic	6	3	..	..	..	1	2		
	336	159	6	16	2	19	94	27	13

Number of curetings not examined, 203 or 60.42 per cent.

Number of curetings diagnosed, 134 or 39.5 per cent.
Menstrual phase, 70.1 per cent.
Hyperplasia, 20.5 per cent.
Endometritis, 9.4 per cent.

TABLE III.—Curetings of gynecological ward cases for the years 1916, 1917, and 1918 which showed on microscopical examination hyperplastic uterine mucosa or interstitial endometritis with a classification of the conditions in which they occurred.

Operations	No.	No.	Hyperplastic mucosa	Interstitial endometritis
Abdominal	21			
For fibromyoma	..	2	2	
For salpingitis	..	10	5	5
For oöphoritis	..	2	2	
For retroversion	..	3	3	
For retroversion and salpingitis oöphoritis	..	1	1	
For retroversion and oöphoritis	..	3	3	
Abdominal plastic	21			
For retroversion, lacerated cervix, and perineum	..	3	3	
For retroversion and lacerated cervix	..	7	4	3
For retroversion and lacerated perineum	..	5	2	3
For retroversion, lacerated perineum, and pelvic adhesions	..	1	..	1
For retroversion, oöphoritis, and lacerated cervix	..	1	1	
For retroversion, oöphoritis, lacerated perineum, and cervix	..	2	2	
For retroflexion, lacerated cervix, and perineum	..	1	1	
For prolapsus, lacerated cervix, and perineum	..	1	1	
Vaginal and plastic	2			
For prolapsus, lacerated cervix, and perineum	..	2	..	2
Plastic	23			
For lacerated cervix	..	3	1	2
For lacerated perineum	..	6	4	2
For lacerated cervix and perineum	..	13	11	2
For rectovaginal fistula and perineum	..	1	..	1
Divulsion and curettage	56			
For metrorrhagia	..	25	10	15
For metrorrhagia and polypus	..	1	..	1
For menorrhagia	..	6	3	3
For metrorrhagia and menorrhagia	..	4	3	1
For dysmenorrhea	..	6	5	1
For dysmenorrhea and menorrhagia	..	4	..	4
For dysmenorrhea, metrorrhagia, and polypus	..	1	..	1
For amenorrhea and pelvic cellulitis	..	1	1	
For anteflexion	..	5	5	
For sterility	..	1	1	
For leukorrhea	..	2	1	1
Total	123	..	75	48

CASE III.—Illustrates the importance of changes in the tubes causing menstrual disturbance. Mrs. L., aged thirty-five, married seventeen years, two children sixteen and fourteen years of age, abortion thirteen years and gonorrhea fourteen years ago. First menses at twelve and was regular up to birth of second child which was followed by retained placenta and irregular and profuse metrorrhagia. For past three months has flowed daily, at times passing clots. Curetings showed hyperplasia of uterine mucosa. Patient readmitted three months later as symptoms have continued. At this time a complete removal of the uterus and adnexæ was done and a pathological examination showed hematosalpinx (ex hydrosalpinge) and hyperplasia of uterine mucosa.

CONCLUSIONS.

1. About 96 per cent. of gynecological cases show no endometrial changes and therefore curettage is unnecessary.

2. In about 4 per cent. showing endometrial changes the procedure is of questionable therapeutic value.

3. As a diagnostic measure it is of practical value in only 5.1 per cent. of carcinoma of the uterus.

4. When curettage is performed in a hospital and by skilled operators, there is a morbidity in at least 5.5 per cent.

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A REVIEW OF THE UTERINE MYOMATA OPERATED ON AT THE WOMAN'S HOSPITAL DURING 1918, COMPRISING 262 CASES.*

BY

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(With eight illustrations.)

THE surgical records that are being kept at the Woman's Hospital make it possible to study collectively large groups of similar pathological conditions not only from the standpoint of the pathologist but also from that of the surgeon, regarding the surgical recoveries, and lastly from a most important viewpoint, that of the patient in the final outcome of the treatment that she has undergone for the purpose of regaining her full health.

A year ago I reported the results of a review of all of the uterine myomata operated on at the Woman's Hospital from 1910 to 1917, consisting of 1500 cases.[1] The present study is confined to the surgical work of 1918.

There were 262 cases operated on for uterine myomata during 1918 with a mortality of four patients or 1.52 per cent. Two of these died of embolus. One, a Mrs. L. M., had a myomatous tumor associated with a double hydrosalpinx. Her recovery was even and uninterrupted. She had a panhysterectomy with removal of both adnexa on September 6th. On September 23d, she was out of bed and moving about. On September 27th, she died from embolus. The other, Mrs. M. F., was very fleshy. She had a large myomatous tumor of 12 pounds weight after removal. The venous sinuses were unusually large and abundant. The tumor was removed without material difficulty, a supravaginal hysterectomy being done. As the patient was very stout, she was shifted frequently in bed and kept in the semiprone position. Her recovery was without complications until July 3d, seventeen days after operation when, after being out of bed for about a week, she died suddenly from what proved to be at the autopsy a myocarditis and pulmonary thrombus.

* Published in the *American Journal of Obstetrics*, March, 1919.

[1] See *American Journal of Obstetrics*, Vol. lxxviii, September, 1918.

The two remaining deaths were caused: one by intestinal obstruction occurring eight days after myomectomy associated with a ventral suspension and removal of tuberculous appendages. The other followed within three days after a supravaginal hysterectomy and removal of purulent uterine appendages.

The two deaths from embolus in the present series of 260 cases taken in connection with seven from a similar cause in the 1500 cases operated on during the eight years previous, in which there were twenty-eight deaths from all causes, gives embolus as the largest causative factor in the fatal terminations. The next highest cause was peritonitis in seven of the fatal cases.

That embolus should be the causative factor in 28 per cent. of the fatal cases in our series of 1760 operations, or one-half of 1 per cent. of the entire number operated on, accentuates the theory of the possibility of myocardial changes becoming associated with the presence and growth of myomatous tumors of the uterus.

Complications During Recovery.—The records show that ten of the 262 patients had their recovery impaired by some complication. Two of these were not discharged until thirty days after the operation on account of a severe colon bacillus infection of the kidneys. One developed a vesicovaginal fistula from an ununited injury to the bladder. One developed a severe bronchitis immediately after operation, resulting in the wound reopening on removal of the skin sutures on the eighth day. Six developed mural abscesses in the abdominal wound of superficial character in most instances.

This small number, being less than one patient out of every twenty-five developing any departure from a thoroughly uncomplicated recovery, speaks well for the surgical, operating room and anesthetic technic of the hospital. Especially is this true when it is borne in mind that our study covers the work of not one operator but of the entire staff, in all varieties of myomata, including many with severe coexisting pathological conditions.

Follow-up Review.—A study of any group of cases should not end with the discharge of the patient from the hospital. The final end-result is after all the test of the character of the work that has been done and the surgical judgment shown by the operator.

Many of the cases here reported are private patients of the operators and it is impossible to trace their detailed condition. The "follow-up" clinic is confined to the ward patients so far as the institution records show. Many of these did not return to the clinic as directed, nor have they been able to be located by the visiting nurses.

One hundred and seventeen, however, did report. It is reasonable to assume that the remaining ward patients did not care to give the time to return, having no symptoms concerning which they wished to consult the hospital. This in fact was the statement of several who were found by the visiting nurse.

Of the number examined ninety-nine were in excellent condition from a surgical standpoint and stated that they felt absolutely well. Five complained of menopause symptoms. Their ages ranged from thirty-three to forty-two. In three, both ovaries and tubes had been removed and in the remaining two one ovary and tube had been saved.

The few patients complaining of the forced menopause is striking, especially when you consider the 113 patients examined with whom there is no record of any symptoms except of a passing character which caused no inconvenience. It may be argued that these patients are hard-working women and not given to noting symptoms which would be distressing to those of the more leisure class. This I have no doubt is to a great extent true, however, the belief has become strongly fixed in my mind that in the presence of tumor growth the function of the ovaries from the standpoint of internal secretions is greatly diminished and in this class of cases their importance in maintaining the nervous equilibrium of the patient is to a great extent overestimated. This former belief resulting from clinical observation is apparantly borne out by the study of these cases under consideration where usually one or both adnexa have been removed on account of circulatory changes or infection.

From the psychological standpoint it is well to be able to say to the patient that one or both adnexa have been preserved and for this reason it is my custom to preserve such in every instance where they are healthy. In following this custom in hysterectomies for myomata I am guided more by a surgical repugnance against sacrificing a part macroscopically healthy and not likely to give rise to future trouble, than from a feeling that such a preservation will be of benefit to the patient other than possibly that of a mental character.

In hysterectomies where the tubes are removed I think it better surgery also to remove the ovaries, even though apparently healthy, on account of the probable after disturbance in the conserved ovaries due to interference with their circulation. This is an experience that every operator has had.

Fourteen of the patients who returned gave symptoms directly referable to the end-result of the operation. One, operated on April 1st, has developed a hard mass posterior to the cervix. This

mass has increased in size. The patient complains of no symptoms. Her operation was a supravaginal hysterectomy with removal of the right tube and ovary. This patient is being kept under observation.

Eight patients had symptoms referable to the reformation of pelvic adhesions found at the time of operation, of which six had a myomectomy done. It is a problem how to handle such conditions in the presence of extensive former adhesions. We have no means at hand to prevent the reformation of adhesions if we cannot cover over the raw surfaces by healthy peritoneum. Oils and vaseline have not been of value in my hands and cargyle membrane cannot as a rule be applied. An effort to lift the uterus and adnexa by some form of operation in order to prevent them from being pulled downward by the reformation of adhesions is not uniformly successful in my hands. At a later date it is not uncommon to find that the suspension measures adopted have been stretched out and that the uterus is pulled partly back, with the patient complaining of more pain than before on account of the added tension on the suspension or round ligament attachments.

The subsequent pain and pelvic weight experienced by these patients as a rule is due to the pulling back of the uterus and adnexa followed by the necessary circulatory engorgement. I feel that in some of these conditions it would be good surgery to remove the adnexa and amputate the uterus, which usually is large, instead of doing a conservative myomectomy, especially if there is no likelihood of a later pregnancy.

One patient complained of pain over the right conserved ovary. This operation was a supravaginal hysterectomy, double salpingectomy and left oöphorectomy. Evidently on account of the patient's age, thirty-eight, an ovary was left. There is no statement that the patient complained of menopause symptoms to any degree. I question, however, whether she was saved from these symptoms by the ovary left behind.

Unless there is some special reason, such as a possible pregnancy, why an ovary should be conserved after its tube has been removed, I think it better surgery to remove the ovary at the time the tube is excised and certainly in instances of the removal of the uterus and the remaining adnexa. This opinion founded on clinical experience is borne out by Sampson's studies of the tubal and ovarian circulation. He has clearly shown by his combined tubal and ovarian vascular injection specimens, that much care must be exercised in removal of the tube in order not to disturb the ovarian circulation; and at times

this disturbance is impossible to avoid on account of the abnormal distribution of the vessels.

Coincident Pathological Conditions Associated with the Myomata.—The increased circulatory changes and disturbances as the result of the presence of the myomata give rise to essential pathological changes in the adnexa. The larger the tumor growth the more pronounced are these conditions. Prominent among these are cysts of corpus luteum origin. Forty of the 262 myomata had such cysts associated with them. These varied in size from a few cubic centimeters capacity to that of a half liter or more. Hemorrhagic cysts were also not uncommon, there being seventeen of this character.

As would be expected the Fallopian tubes showed a sympathetic involvement, there being twenty cases with chronic salpingitis and sixteen of hydrosalpinx. Not all of these tubal changes, however, can be attributed to the disturbed circulation as a result of the tumor growth. The majority of these conditions carry no especial significance except that of being in a great measure the cause of pain. This and to a lesser degree hemorrhage, were the chief causes for relief from which patients entered the hospital for operation.

The remaining pathological ovarian conditions associated with the myomata were dermoid cysts, four; serous cysts, seven; parovarian cysts, two; pseudomucinous cysts, one; adenocystoma, three; papillomatous cysts, two; carcinoma of the ovary of a papillary glandular type, two.

The associated tubal involvements in addition to chronic salpingitis and hydrosalpinx mentioned were: purulent salpingitis, two; tubercular salpingitis, four; hematosalpinx, four; gonorrheal salpingitis, one.

Normal pregnancy existed in six cases and tubal gestation in one. The interest associated with these intercurrent tubal and ovarian conditions is the difficulty of diagnosis previous to the opening of the abdomen. In many instances it is impossible and any treatment of myomatous tumors (other than that of surgery) which has for its preliminary basis a clear-cut diagnosis must in many instances fall short of what is expected. Unilocular tumors of moderate size do not ordinarily complicate the ability of the trained examiner to map out clearly the pelvic contents. It is in this class of cases with hemorrhagic symptoms that radium and the *x*-ray are especially applicable. Through them hemorrhagic patients can be saved a mutilating operation. When we read, however, of 95 to 100 per cent. cures by enthusiastic advocates of the *x*-ray or radium, I wonder about the possible mistakes in diagnosis, for we certainly

do make them, even to the point of making the diagnosis of a myomatous tumor when some other form of neoplasm exists. In addition every operator is fully alive to the possibility of finding added pathological states which were impossible to previously map out in connection with the tumor growth.

In the 1760 myomatous tumors removed at the Woman's Hospital during the last nine years, we find that ninety or 5.1 per cent. of the tumors were undergoing necrotic changes. In some of these this condition was diagnosed previous to opening the abdomen; in the majority this was not suspected. The same can be said of calcareous changes of the myomata; twenty-five or 1.5 per cent. existed among the cases during the same period. Carcinoma of the body was also coincident in twenty-five or 1.5 per cent.

Patients with myomata having necrotic changes or with those undergoing calcareous degeneration whould not wisely be selected for treatment by the *x*-ray or radium. In carcinoma of the body, while radium can be unquestionably utilized in proper strength with advantage to the patient, still the complete removal is accepted as giving the most certain curative result.

The "follow-up" or end-results of the treatment of myomatous tumors by *x*-ray or radium is after all the acid test, and should not include simply the reduction in size of the tumor but it should also include the relief of pain and the restoration to permanent health of the patient.

Surgery gives as in our previous 1500 cases 1.86 per cent. mortality and in the present report of 262 cases, 1.51 per cent., with ten patients making an uneven recovery. In the follow-up of these patients fourteen were not entirely restored to health, due in six instances to reformation of previous extensive adhesions following conservative myomectomies.

This is the end-result of surgery applied to a series of consecutive cases by the full operating staff of the hospital. Can it be equalled by *x*-ray or radium applied for the purpose of absorbing or curing the myomata, even in selected cases? I question it and especially when we take in consideration the contraindicating, unrecognizable degenerative changes present in those tumors and also the associated pathological conditions in the adnexa.

My belief is that we should use the *x*-ray and radium in myomata for the purpose only of controlling bleeding and then only when the contents of the pelvis can be clearly mapped out. They are a valuable means under such conditions and by their use, what would otherwise be a mutilating operation, can be avoided.

With the myomatous tumor growths the association of coexisting pathological conditions in the uterus is not uncommon, as also are changes in the tumors themselves. We find in the 262 cases here reviewed two cases of early carcinoma of the body of the uterus and four others of carcinoma colli of a more advanced character. The cervix was the seat of carcinoma in three cases.

The changes in typical myomatous structure vary; there were two of the edematous type of which an excellent photo-micrograph is here shown (Fig. 1). Hyaline degeneration of the blood-vessels is clearly seen.

There was one instance of hyaline degeneration of which a good section is reproduced in Fig. 2.

Necrotic changes in the myomata were present in seven of the cases operated on. One of these, an inflamed myoma with pus cells infiltrating the tumor tissue is shown in Fig. 3.

In three cases the tumors had undergone calcareous changes.

Lymphangiectatic myomata existed in two cases. The photograph (Fig. 5) presented of such a condition associated with pregnancy, is from a patient operated on prior to the present year. Its interest, however, is my reason for presenting it.

Cellular myoma is a condition not often met with in our series of 1760 cases (Fig. 4).

No instances of sarcomatous changes occurred in the series during the past year. There were seven cases among the 1500 operations during the eight years previous, a little less than 0.4 per cent. for nine years. This is much less than the 2 per cent. ordinarily given for sarcomatous changes. Miller writing from Freiburg clinic collected the statistics of 9750 cases in which there were 1.96 per cent. sarcomatous myomata. This differs, however, from those collected by Lewis and by Olshausen comprising 8988 cases in which 1.3 per cent. were sarcomatous. Miller gives V. Gurlt as reporting 883 myomatous cases with only two sarcomas among them.

Adenomyoma of the uterus existed in four cases of which one is figured in Fig. 6.

Adenomyometritis existed in nine cases. See Fig. 7.

I am indebted to Dr. Lawrence W. Strong, Director of the Pathological Department of the Woman's Hospital, for his courtesy in furnishing the excellent photomicrographs shown here.

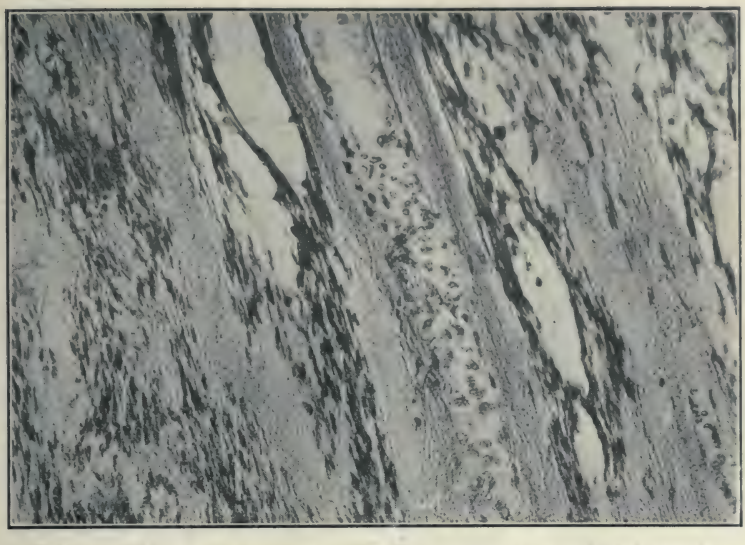

FIG. 1.—Edematous myoma. Hyaline degeneration of blood-vessels.

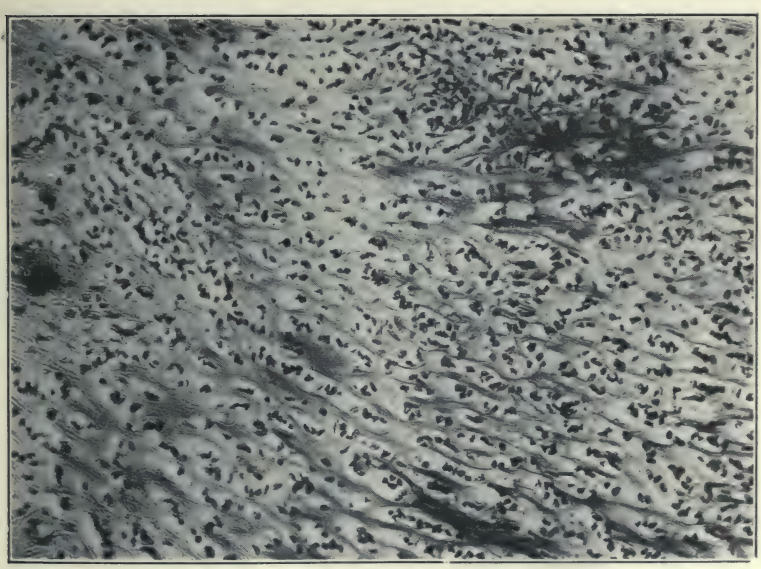

FIG. 2.—Hyaline degeneration of myoma.

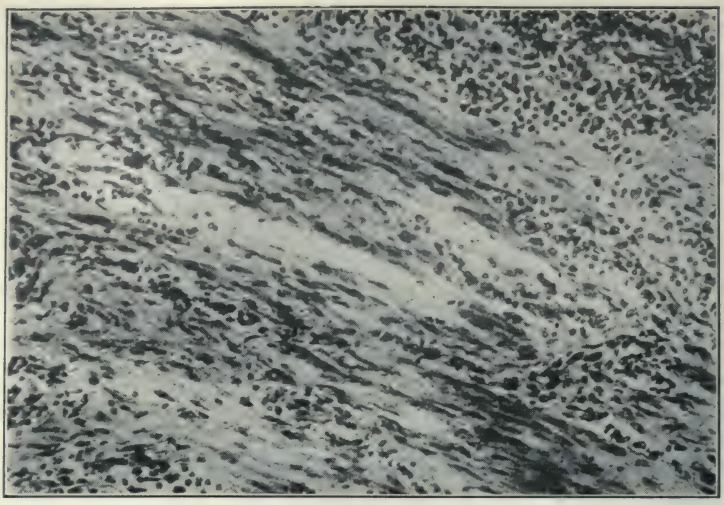

FIG. 3.—Inflamed myoma. Pus cells infiltrating myomatous tissue.

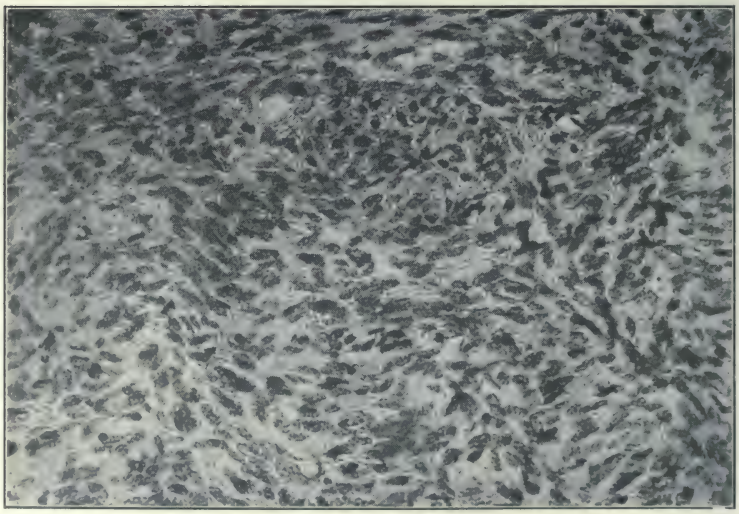

FIG. 4.—Cellular myoma.

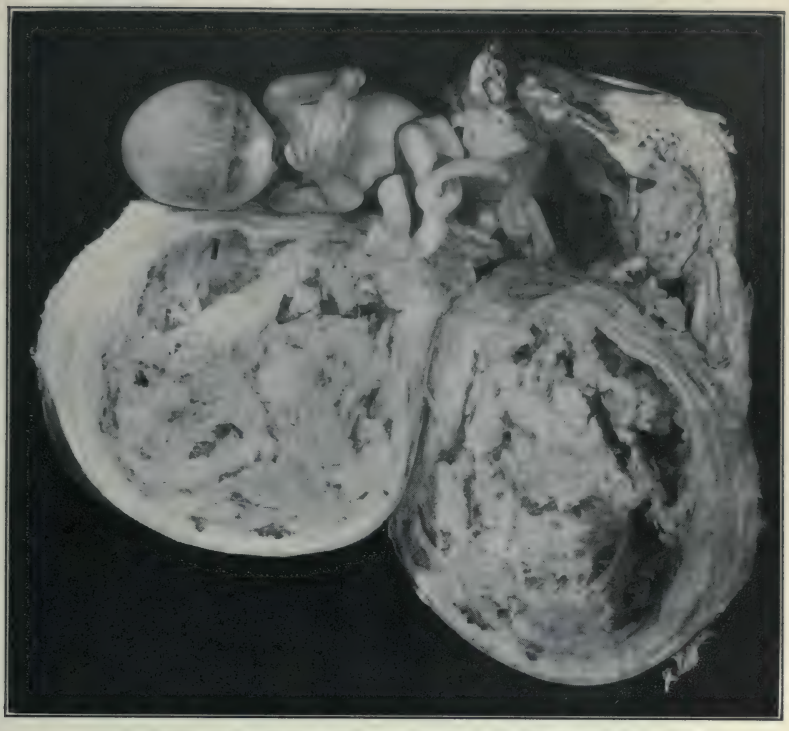

FIG. 5.—Cystic and lymphangiectatic myoma in pregnant uterus.

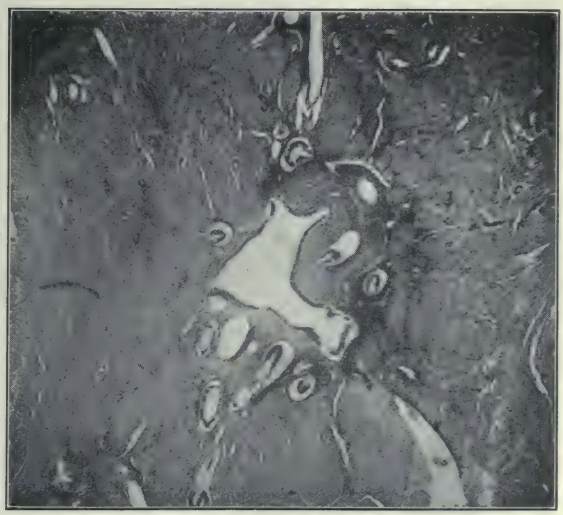

FIG. 6.—Adenomyoma. Definite tumor of myomatous and glandular tissue.

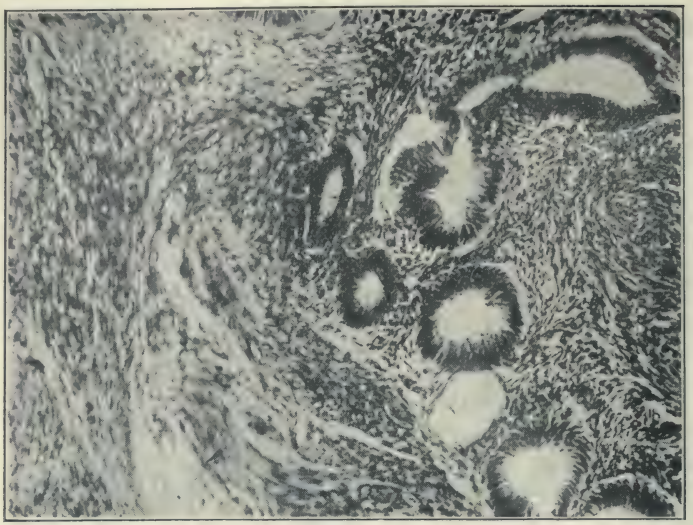

FIG. 7.—Adenomyometritis. Irregular penetration of uterine glands into myometrium.

FIG. 8.—Myoma polyposum.

A VAGINAL HYSTERECTOMY TECHNIC FOR THE CURE OF PROLAPSE OF THE UTERUS WHEN THE REMOVAL OF THE UTERUS IS NECESSITATED, WITH SPECIAL REFERENCE TO LAPPING OF THE VAGINAL FASCIA IN ALL FORMS OF VAGINAL PROLAPSE.*

BY

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(With seven illustrations.)

In an article read by me before this Society at its last meeting describing a subtotal vaginal hysterectomy technic for the cure of procidentia uteri, I reached the conclusions that (1) there was encountered in it an element of danger to life, as the result, probably of necrosis of the reconstructed uterine body, which did not justify its further use; (2) that the interposition of the reconstructed body added nothing to the result when success was obtained; (3) that the essential features in the successes were the approximation of the cut surfaces of the cardinal ligaments and the correct readjustment of the fascial structure of the anterior vaginal wall.

My object in this communication is to make a preliminary report of a vaginal hysterectomy technic for the cure of prolapse of the uterus, where the removal of the uterus is necessitated, and to advocate the principle of fascial lapping in all forms of vaginal prolapse. The initial steps of the hysterectomy technic will be recognized as identical to those described in my previous study. The method of lapping the fascia described in the following sentence will be recognized as a plan of procedure suggested by me in the article referred to. "Sometimes the anterior vaginal wall, like the uterus, is considerably hypertrophied. When this is the case the mucosa can be removed in part from one lateral strip and the strips lapped so as to give additional strength."†

It was not until December 11, 1917 and January 17, 1918, that there came under my care cases which conformed to the above

*Read before the American Gynecological Society, May 11, 1918. From "*Surgery, Gynecology and Obstetrics*," February, 1919.

†Transactions of the American Gynecological Society, 1917, p. 612.

description, namely, great hypertrophy of the uterus and vaginal wall and complete procidentia. A report of these cases, and of the operation performed for their relief, was made before the New York Obstetrical Society, February 12, 1918, and a description of the procedure which was followed, will be published in the June issue of the *American Journal of Obstetrics* from which description the following is in part taken.

VAGINAL HYSTERECTOMY AND FASCIAL LAPPING FOR PROCIDENTIA UTERI.

Two curved incisions, meeting in front and behind, are made about the cervix at its juncture with the vaginal mucosa. The vaginal tissue is separated from its cervical attachments and each cardinal ligament area of tissue severed from the cervix and penetrated and tied with a chromic gut suture No. 2. As the free ends of these sutures are to be used at the completion of the operation forceps are now attached to each group.

The vesicofascial area may be entered by either a longitudinal incision or by the curved incisions as they pass above and to the sides of the cervix. The preferable approach to this area of cellular tissue is through the curved incisions. When this area or line of cleavage between the bladder and fascia is found, it is followed by blunt dissection on each side to the lateral limits of the anterior vaginal wall. The so-called vesicouterine ligament, which is but a part of the vesicovaginal fascia, is next severed and the bladder separated entirely from its fascial attachment, starting below and working upward. As the freeing of the bladder from the fascia is continued toward the urethra, the anterior vaginal wall is incised in the median line until the blending of the fascia with the urethral tissue is reached.

The posterior surface of the bladder is now completely separated from the anterior wall of the cervix and the peritoneal reflection incised. The tissues between the cervix and the rectum are likewise separated but the posterior peritoneal reflection is not incised.

The corpus uteri is now delivered through the anterior peritoneal opening and a narrow strip of gauze, to which is attached a piece of catgut, is passed into the peritoneal cavity to protect it and prevent the intestines and omentum from protruding.

The vaginal flaps are next prepared for lapping by first trimming them longitudinally to not less than half their original size. From the right flap, or that to the left of the operator, the mucosa is completely removed. This flap is severed crosswise near its urethral

attachment to the extent of about ½ cm. so as to facilitate its adjustment when anchoring it under the opposite flap.

Four or more mattress sutures of chromic gut No. 2 are now inserted in such a manner as will anchor this denuded flap under the undenuded flap and to the opposite stable line where the fascia meets the lateral limit of the vagina. Four or more interrupted chromic gut sutures No. 2 and a continuous suture are used to anchor the undenuded flap to the opposite stable line or lateral limit of the vagina and also to approximate the cut edges of the mucosa.

One strand of each chromic gut suture surrounding each so-called cardinal ligament is utilized as a running suture along the posterior cut surface of the vaginal vault to prevent hemorrhage, which not infrequently occurs from their surface. The remaining strands are now tied to approximate the cut "cardinal ligament" tissues. These latter sutures are used again and made to penetrate the lower margin of the newly constructed anterior vaginal wall from within out and tied to the sutures passed through the posterior vaginal wall. Before tying these sets of sutures, a narrow strip of iodoform gauze is passed into the posterior vaginal space. Iodoform packing in the vagina completes the operation.

Previous to operation a 10 per cent. nitrate of silver solution is applied to the vaginal mucosa and the external os closed with a continuous catgut suture.

The features which I would particularly emphasize in this technic are first, the separation of the cellular tissue at the beginning of the operation from the posterior surface of the cervix up to the peritoneal reflection without opening into Douglas' cul-de-sac. The great advantage of not entering the peritoneal cavity at the beginning of the operation, is that the continuity of tissue here acts as a barrier to prevent the contents of the vagina from soiling the peritoneal cavity and the intestines from protruding into the vagina, it also prevents the cervix uteri from coming in contact with the peritoneum when the fundus is anteverted and the cervix is forced back into the vagina.

The second feature pertains to the removal of the corpus, which is delivered through the anterior peritoneal opening and operated on at the vulva. Each step in its removal is executed with greater ease and exactness by attacking the upper portion of the broad ligaments first and working downward, than by attacking the tissues around the cervix first (corpus remaining in peritoneal cavity) and working upward.

The third feature is the reinforcement of the anterior vaginal wall by lapping the fascia and anchoring the cut margins to the stable areas of the vaginal canal and approximating the cut surfaces of the cardinal ligaments.

That prolapse of the uterus, as well as of the anterior vaginal wall has been cured by varied surgical procedures is not to be questioned, but failures continue to occur and no method has yet established itself in the confidence of the majority of surgeons.

When success is attained by any of the methods per vaginam now in vogue, emphasis is placed upon some particular feature considered essential for success. When hysterectomy is done for the relief of procidentia, we find emphasis laid upon the approximation of the cut edges of the round and broad ligaments in one method, the shortening of the uterosacral ligaments or the anchoring of the round ligaments in the vault of the vagina in another, the interposition of the approximated round and broad ligaments or of the resected corpus uteri in still others. In my opinion all these special features are given undue consideration, and success when attained is the result not of them, but of a common element entering into all of them, namely, surgical adjustment of the pelvic fascia.

It is not my object to discuss the individual operations for the cure of procidentia uteri and cystocele, but it would seem fitting because of its historic interest and the principle involved in the Emmet operation to do more than make passing mention of it.

Emmet utilized the principle of fascial support of the anterior and lateral vaginal walls with the intuition and skill of the consummate surgeon he was. He recognized that success depended "upon the unyielding line along the vaginal sulcus on each side where the walls are connected with the pelvic fascia"—and that this tissue owing to its elasticity can be stretched to a certain degree but for all practical purposes the areas are fixed (Emmet's "Principles and Practice of Gynecology," page 257). By Emmet's method, two lateral fascial surfaces are united to a central fascial surface, in this way the fascial support of the uterus and bladder is reconstructed and we have here the first instance, on a limited scale, of fascial lapping of the anterior vaginal wall. In Emmet's hands success by this method was the rule. In the hands of others success seems to have been the exception. I would not refer to this operation, long since considered obsolete by many, were I not convinced that it possesses an essential feature of success. Grant Baldwin recognized this fact several years ago and also the cause of failure in the Emmet

technic, and modified it with such results as should demand our respectful consideration.

It would seem a justifiable conclusion, with the evidence at hand, that the underlying principle of success in operations for the cure of uterine and vaginal prolapse is the proper surgical adjustment of the pelvic fascia, but the fact remains that we have not yet developed a standard technic or one which can be applied, with such modifications as the necessity of the individual case demands, to meet all requirements.

When a prolapsed uterus has undergone such structural change as necessitates its removal, or when, after menopause, its removal is considered for one reason or another desirable, the vaginal hysterectomy technic, as herein described, will prove I believe the method most adaptable and satisfactory. I recognize that it has not yet been put to the test of time, but as it is in principle identical to that upon which Nature, under normal conditions, depends for support, confidence in its ultimate success would seem justified.

CERVIX AMPUTATED, CORPUS RETAINED, AND FASCIA LAPPED.

When it is found advisable in cases of procidentia uteri to retain the uterine body but amputate the cervix, the following technic presents certain advantages.

The first stages of the technic are in part identical to the first stages of the vaginal hysterectomy technic previously described, that is the vesicofascial area near the cervix may be entered by either the longitudinal or curved incisions. The line of cleavage is then followed laterally to the side walls of the vagina, longitudinally to the urethral region and along the cervix to the peritoneal area. As the separation of the bladder from the fascia progresses, the anterior vaginal wall is incised in the median line up to the urethral region. The vaginal wall flaps are now trimmed longitudinally to the extent required and the flap to the left of the operator denuded of its mucous membrane. The sutures anchoring the flaps are placed in the manner described in the vaginal hysterectomy technic for procidentia uteri, namely, four or more mattress sutures being used to anchor the denuded or underlapping flap to the opposite stable line of the lateral wall of the vagina, and four or more interrupted chromic gut sutures and a continuous suture to anchor the undenuded or overlapping flap to the opposite stable line of the lateral wall of the vagina.

Previous to tying the sutures of the anterior vaginal wall, the mucosa about the cervix is stripped back laterally and posteriorly

sufficiently to permit of a high amputation of the cervix. The sutures of the cervix are placed according to a plan which is here particularly adaptable and serviceable. One figure-of-8 suture is inserted through the upper area of the cut surface of the cervical stump and one through the lower area. These two sutures may be placed immediately after amputating the cervix and used as tractors, and to control hemorrhage. At the completion of the operation their free ends are passed through the edges of the freed vaginal mucosa and when tied they approximate the mucosa over the stump. The sutures which direct and secure the vaginal mucosa to the cervical canal are inserted in an opposite direction to the classical method of Emmet. The needle is first inserted into the more or less free lateral tissue or cardinal ligaments on each side. The free ends of each of these sutures are passed through the cervical stump near the canal and back through the margin of the freed vaginal mucosa of the same side. By this form of stitching two objects are attained; namely, the cardinal ligaments are anchored to the cut surface of the cervical stump and the vaginal mucosa is anchored to the cervical canal. Extra sutures may be inserted if necessary and finally a narrow strip of iodoform gauze is passed through the cervical canal into the cavity of the uterus to prevent a possible union of the cut edges of the mucosa in the region of the cervical canal; perineorrhaphy is done if required and the vaginal canal is packed moderately tight with iodoform gauze. By the Emmet technic the tissues of the vesical area are used to cover the anterior surface of the cervical stump, and to that extent the anterior wall is shortened. If his method is reversed, according to the plan just described, the length of the anterior wall is not shortened.

When in the child-bearing period prolapse of the uterus and bladder is corrected by fascial lapping and the uterus retained, it is as yet an open question whether or not the reconstructed fascial wall would prevent or in any way interfere with the process of labor. I have not as yet operated for procidentia uteri or cystocele by the fascial lapping method and preserved the entire uterus.

With complete procidentia uteri both the anterior and posterior vaginal walls prolapse in greater part. While this is the rule cases do occur where one wall protrudes from the vulva more than the other, so that in one case we may have a marked cystocele with the posterior wall but little affected, and in the other case a marked rectocele with but little protrusion of the anterior wall. Protrusions of one or another vaginal wall accompanying procidentia uteri does not however necessarily constitute rectocele or cystocele,

but such a situation indicates a more or less damaged structural condition of the walls and may demand surgical repair.

True cystocele is a more common accompaniment of procidentia uteri than rectocele. Either may exist independent of procidentia, but if associated with procidentia they precede and do not follow. A cystocele therefore may exist with the cervix in normal position, likewise a rectocele may exist with the cervix in normal position. The case of Mrs. D. which I reported in my last communication on this subject, was a striking example of the first type and the first case of rectocele to be here reported, a description of which constitutes the basis of my work on fascial lapping for the cure of rectocele, is an example of the second type.

FASCIAL LAPPING FOR RECTOCELE.

The mucous membrane of the perineum is first removed and the rectrovaginal fascia exposed. This fascia is incised at about where it merges with the perineum or its remaining structures. On incising the fascia a cellular area is entered, which area constitutes the line of demarcation between the rectum and the vagina. The cellular tissue encountered is now separated from the under surface of the fascia, laterally to the borders of the levator ani and longitudinally to the region of the cervix. As the freeing of the tissue from the fascia is continued in the direction of the cervix, a median longitudinal incision is made and extended as far as necessary.

The vaginal flaps are now prepared for lapping by first trimming them longitudinally to an apparently excessive degree. The extent of this trimming depends on the amount of redundant tissue or size of rectocele. Roughly speaking only about half of each flap remains and the effect produced after completing the operation is that of overcorrection.

The flap to the left of the operator is carefully denuded of its mucous membrane. Scissors are used to make the denudation, as by careful use of them a thin submucous layer of tissue is left upon the fascia, which serves to maintain the fascial continuity of the flap. The flap thus remaining is relatively thick and resists the strain of the sutures better than the fascia alone would do.

The denuded flap is now severed crosswise at its highest point to the extent of about 1 cm. in order to make a better fascial approximation when the flaps are lapped.

Four or more mattress sutures of chromic gut No. 2 are now used to

anchor the denuded or underlapping flap to the opposite unyielding line where the fascia meets the lateral limits of the vagina. Four or more interrupted chromic gut sutures and a continuous suture are used to anchor the undenuded or overlapping flap to the opposite unyielding line along the side wall of the vagina.

With rectocele, as with cystocele, we have a damaged condition in part or in whole of the fascial support. When this damage is not extensive and is limited to the perineal area, surgical approximation of the perineal portions of the levator ani muscles constitute a sufficient barrier, but when an extensive rectocele exists such as involves the entire posterior wall or when the fascia has been torn away from each lateral wall, as in the second case to be cited, fascial lapping to the extent of the rectocele can alone be depended upon.

A rectocele may have associated with it taxing complications and the operative technic used must be modified accordingly, as illustrated in the following case. Laceration of the perineal body through the sphincter ani, extensive lateral tears of the posterior vaginal wall forming a sulcus on each side 4 cm. or more in length and 2 cm. in depth. The rectovaginal fascia was here torn away from the lateral walls and the posterior or rectovaginal wall bulged out like a tumor protruding from the vulva.

A crescentic incision was first made over the torn perineal area according to Ristine and the flap of tissue dissected down to the rectum and the skin border. The protruding pouch was next incised immediately above the crescentic incision, and the rectovaginal cellular area entered. The line of cleavage from this point was followed laterally to the side walls and longitudinally beyond the limits of the pouch. A longitudinal incision was now made in the middle of the posterior wall extending half its length. The flaps were trimmed longitudinally and the mucosa was completely removed from the sulcus and the flap to the left of the operator. The mucosa of the sulcus to the right of the operator was also removed, but the mucosa of the vaginal flap from this side was not removed. Several mattress sutures were inserted which when tied approximated the denuded surfaces of the sulcus to the right and anchored the denuded flap to the stable line, where the fascia normally meets the lateral limits of the vagina. The free margin of the undenuded flap was anchored to the opposite stable line along the side wall of the vagina. The mucous membrane edges were united with a continuous catgut suture. Two plain catgut sutures No. 0 penetrated each free end of the sphincter ani muscle to approximate and accurately adjust these separated ends. Silver-wire sutures were

placed in the perineum in the usual manner, one penetrating the free ends of the muscle. The results of this operation were not only a complete restoration of the sphincter ani and the perineal body, but a correction of the rectocele and an elevation of the entire posterior vaginal wall to practically its normal position. Hysterectomy had previously been performed for procidentia according to the method herein described, a report of which operation will be found in the AMERICAN JOURNAL OF OBSTETRICS, June, 1917.

It was found necessary in the first case of rectocele here reported, to keep a depressor in the space created by the separation of the rectum from the vagina in order to prevent the fat deposited in the cellular tissue from interfering with the proper adjustment and anchorage of the denuded flap when the sutures were tied.

Fascial lapping meets its ideal application in extensive rectocele and cystocele. When applying this principle to these conditions the several fascial areas which have been given special names, have as such no particular value.

When cystocele is present a greater portion of the bladder is enveloped by the overstretched anterior vaginal fascia than normally exists. The same is true of the rectum when rectocele exists and the surgical problem here presented is to restore the normal relationship of the viscera and fascia, and reinforce the supporting structure so as to form an effective barrier and support.

The most satisfactory approach to the line of cleavage between the bladder and the fascia is at the angle formed by the cervix and the anterior vaginal wall. The initial incision sweeps around and above the cervix and exposes the vesicovaginal fascia at its juncture with the cervix. The exposed fascia is grasped first to the right of the median line, then to the left and incised horizontally. The reason for the selection of these points is that the connection between the bladder and the fascia is less intimate than at the median line. The line of cleavage entered here is followed laterally to the limits of the vagina and then longitudinally to the region of the urethra. The longitudinal incision of the anterior wall is started in the median line below and continued upward as the bladder is separated from the under surface of the fascia.

When the vesicofascial line of cleavage is sought entirely through a vertical incision of the anterior vaginal wall it not infrequently happens, that the line of cleavage between the mucosa and the fascia is mistaken for the line of cleavage between the fascia and the bladder, and as a result the fascia is considerably injured in the effort to define and free the bladder. One of the great advantages

of the fascial lapping technic here described, whether dealing with a cystocele or rectocele, is that the finding and following of only one line of fascial cleavage is necessary. When this line of cleavage only is followed a minimum amount of bleeding results, but when both lines of fascial cleavage are followed, a maximum amount of bleeding occurs, which under certain conditions may terminate seriously. Another important advantage in thus utilizing the fascia without disturbing its continuity, is that a minimum amount of disturbance in its circulation is occasioned, and when the flaps are anchored the circulation in them remains practically unimpaired.

Too much emphasis cannot be laid on the desirability of trimming the vaginal flaps to apparently an excessive degree. Failure will occur if the effect produced after the completion of the operation is not that of overcorrection.

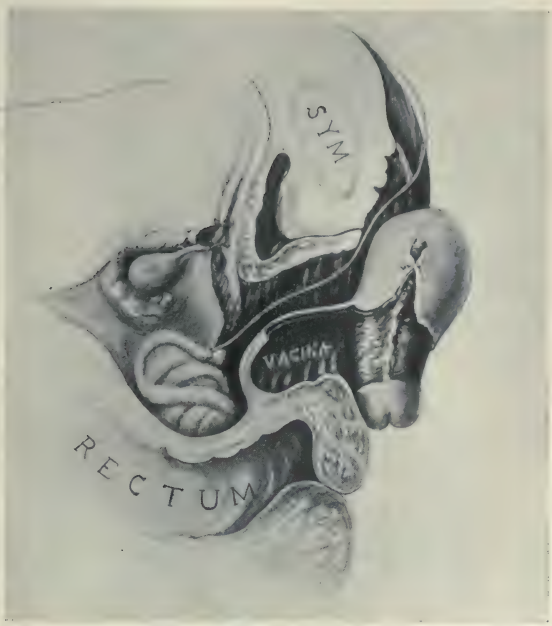

FIG. 1.—Showing the uterus out of the vagina with all its attachments severed except the posterior vaginal barrier, which barrier with the gauze strip passed through the anterior opening, prevents the vaginal contents entering the peritoneal cavity.

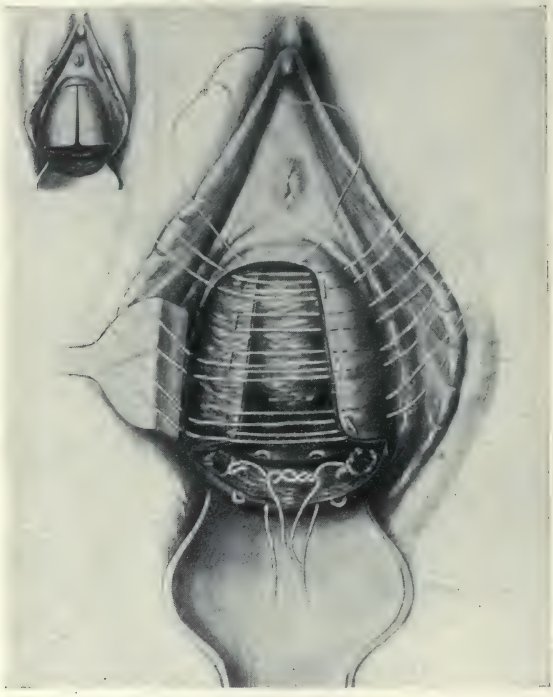

FIG. 2.—The marginal insertion in the upper left hand corner shows the initial incision of the anterior vaginal wall and the opening in the vault of the vagina on the removal of the uterus. The dotted lines indicate approximately the amount of tissue removed longitudinally from each flap.

The larger illustration shows the underlapping flap denuded of its mucous membrane and the sutures placed for anchoring both flaps. A bundle of tissue is seen on each side of the vault of the vagina, encircled by a chromic gut suture. One strand of each suture is passed in and out along posterior vaginal cut surface to control hemorrhage and the other tied with its opposite free strand to approximate the lateral bundles or cardinal ligaments.

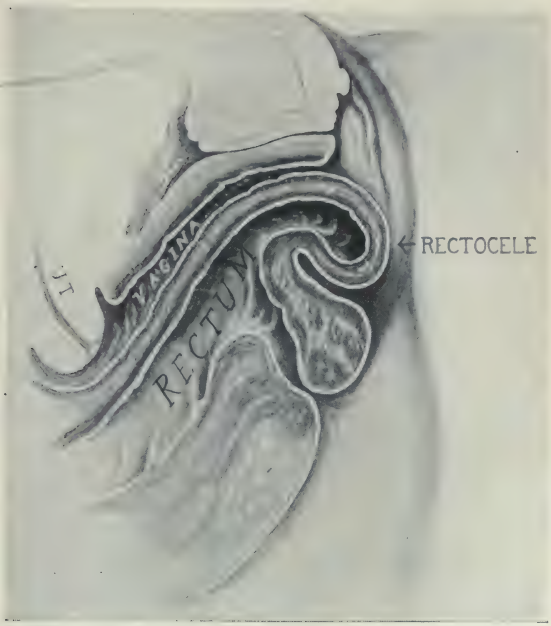

FIG. 3.—A sagittal section showing a larger rectocele with cervix in norma position.

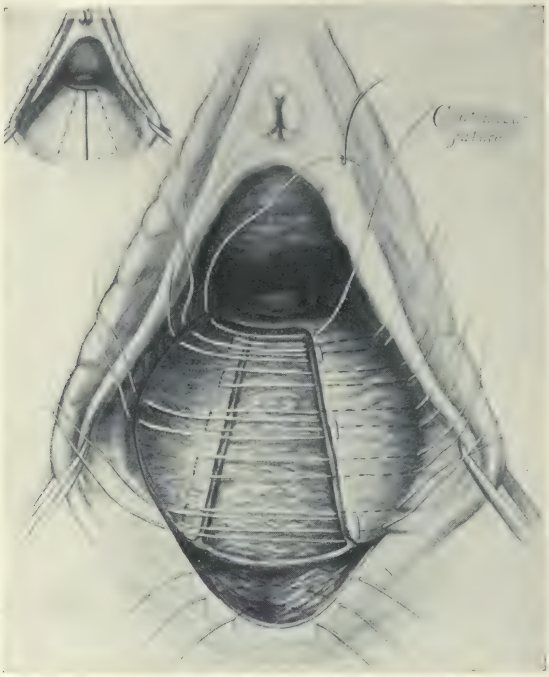

FIG. 4.—The dotted lines on the marginal insert indicate the approximate amount of tissue removed longitudinally from each posterior vaginal wall flap. The drawing is somewhat misleading as the amount of tissue removed is really more than would seem from the drawing. The tendency is to undercorrect by not removing enough tissue. The appearance after operation should be that of overcorrection.

The larger illustration shows the underlapping flap denuded of its mucous membrane; the line of fascia merging with the perineal body; the denuded perineal body and all sutures placed for anchoring flaps and closing perineum.

FIG. 5.—This illustration shows the several stages of the operation for prolapse of the uterus where the corpus uteri is not removed, but where the cervix is amputated. The steps in the operation with respect to the anterior vaginal wall are practically identical to those where the corpus is removed. Immediately after amputating the cervix, two chromic gut sutures No. 2 are inserted in the cervical stump according to the manner shown in the insert. These sutures serve as tractors and control hemorrhage during the progress of the operation. After anchoring the vaginal flaps the free ends of these sutures are passed through the vaginal tissues on each side and when tied anchor this vaginal tissue over the cervical stump. The middle suture in the main illustration is devised first to shift the position of the lateral tissue or cardinal ligament, and second to anchor the vaginal mucosa to the cervical stump. The method is reversed to that of Emmet and tends to lengthen rather then shorten the vaginal wall.

FIG. 6.—This illustration shows a partial rectocele with deep vaginal sulci and a complete laceration of the sphincter. The black line indicates the first incision made in performing the Ristine operation. The repair of the sphincter and correction of the rectocele were done at the same time.

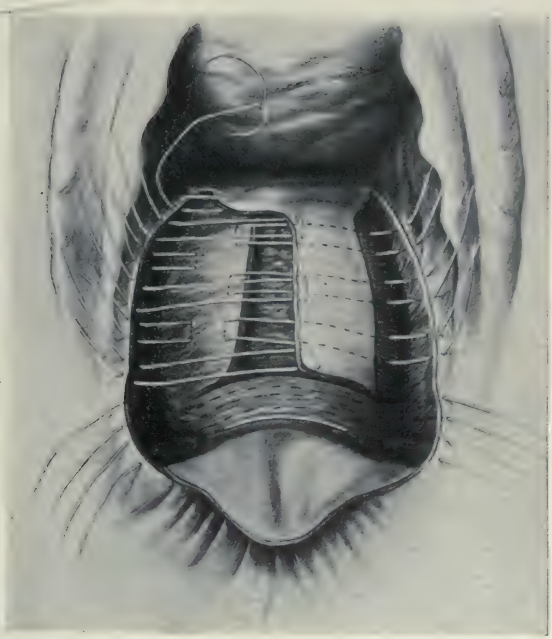

FIG. 7.—In this instance we had two deep sulci to care for. The posterior vaginal flaps were prepared in the way previously described, except that the flap to the right of the operator was not trimmed longitudinally, and that portion of it which extended down in the sulci was denuded of its mucosa as was its corresponding lateral vaginal wall. The sutures were then placed in the manner shown in the drawings. When these sutures were tied, the flaps were anchored in such a way as to obliterate the sulci and elevate the posterior vaginal wall.

Plate III. Tuberculous pyelitis.

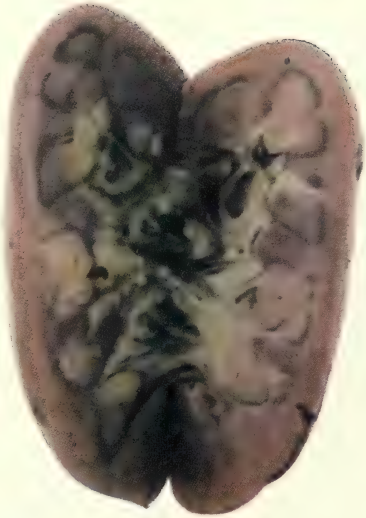

Plate IV. Tuberculous pyelitis.

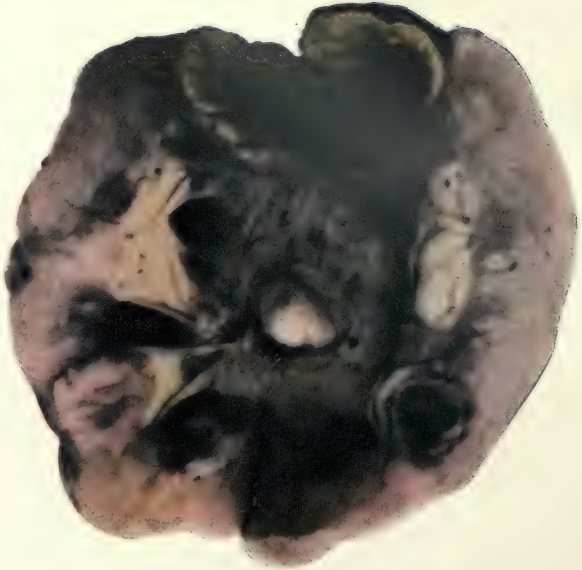

Plate V. Parenchymatous tuberculosis. No active foci.

(The Management of Renal Tuberculosis—H. G. Bugbee.)

THE MANAGEMENT OF RENAL TUBERCULOSIS.*

BY

H. G. BUGBEE, M. D., F. A. C. S.,

Urologist.

(With two colored plates.)

No more distressing condition is encountered in the realm of urology than that of renal tuberculosis. Insidious in its origin and early development how often this disease is allowed to go on, unrecognized, with its remissions and reappearances, until enough of the urinary tract has become involved to render a cure an impossibility. Only through the more careful study and analysis of urinary symptoms have we been able to demonstrate the frequent occurrence of this disease, to follow its progress, and to outline a method of treatment in each individual case.

To form the basis for certain remarks which I wish to make with regard to the diagnosis, pathology, and treatment of renal tuberculosis, I have selected five from a series of cases, operated upon by me, which demonstrate the different types most frequently encountered.

CASE I.—Male, aged thirty-four. For eight years had the patient suffered from frequent, burning urination and pain in the perineum at the end of urination. The symptoms were intermittent for five years, when remissions became less frequent. For the past three years the symptoms have been continuous, and the patient has lost weight and strength. In 1913 he began to void every half hour, with intense tenesmus. The urine was loaded with pus, there was some blood, and many tubercle bacilli. The bladder was contracted, retaining but 1 ounce of fluid; the mucous membrane was edematous, especially about the left ureteral orifice, which was enlarged, rigid (golf-holed), and contained tubercles.

Urine from the left kidney contained pus, blood, tubercle bacilli, and showed a low urea output. Urine from the right kidney contained no blood, pus, or tubercle bacilli.

The left kidney, on removal (Plate I), showed almost entire destruction of the parenchyma, with abscess pockets, some of which contained a thick, putty-like substance, others a thin fluid.

*Presented before the Central New York Medical Association at its annual meeting, Auburn, October 18, 1917. Published in *Surgery, Gynecology and Obstetrics*, May, 1918.

Nephrectomy was done in 1913, and was followed by bladder symptoms for one year, with slow abatement. Two years later, the patient was free from symptoms.

CASE II.—Male, aged twenty-three. Three years ago the patient first noticed frequency of urination, which lasted one month, followed by remission for four months. This attack was relieved, but recurrences appeared from time to time. The last attack continued for three months. There were occasional attacks of pain in left lumbar region, followed by the passage of cloudy urine. The bladder appeared normal. Urine from left kidney was pale, it had a low specific gravity, low urea, contained few pus-cells, and no bacteria. Urine from the right kidney was normal.

Following ureteral catheterization, the patient passed a small phosphatic calculus with an attack of renal colic. The urinary symptoms recurred in two months. Ureteral catheterization revealed a few isolated tubercle bacilli in the urine from the left kidney.

The patient was given tonic treatment and urinary antiseptics for four months, with improvement of local symptoms and general health.

Nephrectomy in 1915 revealed a kidney, the upper pole of which (Plate II) was entirely destroyed, walled off, and contained no active tuberculous foci. The patient was out of the hospital in ten days, and has been perfectly well to date.

CASE III.—Female, aged thirty-one. The symptoms were sudden in onset and lasted four months. They started with frequency, urgency, tenesmus, pain at the end of urination, and hematuria. These symptoms were continuous.

The bladder mucous membrane showed intense congestion and edema about the left ureteral orifice. Urine from the left kidney was twice the amount from the right, alkaline, pale, contained pus, blood, and many tubercle bacilli. Urine from right kidney was normal. The lower end of the left ureter was palpable through the vaginal vault, thickened, and tender.

Nephrectomy in 1914, revealed a kidney of normal size, with several small ulcerations at the angle between the papilla and calyx (Plate III). Bladder symptoms were relieved in three weeks. Recovery was complete.

CASE IV.—Male, aged twenty-one. Extreme kyphosis and lordosis from spinal tuberculosis were present. The tubercular lesion was apparently healed for six years. One month ago, there was sudden onset of frequent, painful urination, and hematuria.

The bladder mucous membrane was deeply congested about the left ureteral orifice. The urine from this kidney was abundant, cloudy from blood and pus, contained normal urea output, and numerous tubercle bacilli. Urine from the right kidney was normal.

Nephrectomy, twenty months ago, was accomplished with some difficulty, owing to the extreme deformity of the chest and abdomen. A small kidney of healthy appearance was removed, which, when sectioned (Plate IV), showed two small ulcerations at the angle between the papilla and calyx. Four months after the operation

in this case, an epididymitis developed, which went on to suppuration, discharging on the surface. Bladder symptoms were relieved immediately following the removal of the kidney. The patient is well to-day.

CASE V.—Male, aged twenty-six. Six years ago the patient developed a pulmonary lesion. Six months later, without urinary symptoms, tubercle bacilli were found in the urine in the course of a complete physical examination.

Examination of the bladder showed a normal mucous membrane and ureteral orifice. Urine from the left kidney was double the amount from the right, pale, contained albumin, pus, blood-cells, tubercle bacilli, and a low urea output. Urine from the right kidney was normal.

The patient was treated by the open-air method until 1917. Repeated cystoscopic examinations and ureteral catheterizations revealed only a deficient left kidney function. No tubercle bacilli were found. For past two years patient has had repeated attacks of dull pain in left costovertebral angle, accompanied by gastro-intestinal symptoms which lasted two or three days, and which were relieved by a clearing out of the bowels.

Nephrectomy, three months ago, revealed a moderately enlarged kidney which, on section, showed numerous walled-off pockets (Plate V) containing a thin serous fluid. The patient is now living in the open and well.

The kidney removed in each of these cases showed the types of lesions encountered, *i.e.*, true parenchymatous tuberculosis, with extensive destruction of renal tissue, as in Cases I, II, and V, and apical tuberculosis or tuberculous pyelitis, as in Cases III and IV.

A knowledge of the pathology of renal tuberculosis is necessary to understand the clinical course of the disease and the proper management of the case.

Observations by Buerger(1), Keyes(2), Eisendrath (3), Braasch(4), Cabot(5) and others verify the fact that the tubercle bacilli gain access to the tissues by a process of filtration from the blood into the parenchyma and urinary tubules, and, instead of being excreted, are arrested, and the various pathological changes, such as infiltration, caseation, etc., begin. The bacilli usually lodge in the parenchyma, so that one sees cases in the early stage where the chief focus in which the typical infiltration and formation of cavities is seen, is associated with more or less nodular involvement of the entire parenchyma, or the bacilli may reach the surface of the papillæ or calyx recess, where they are amassed in sufficient numbers to bring about a tuberculous lesion.

As pointed out by Buerger(1), the angle between the papilla and calyx may afford a favorable nidus for the accumulation of bacteria,

the anatomical disposition of the parts allowing poor drainage. This may result in ulceration, as in Cases III and IV.

As the infection spreads, more and more of the parenchyma undergoes changes typical of tuberculosis in other tissues, *i.e.*, the formation of either granulation tissue, or of miliary tubercles, with subsequent caseation and the formation of larger or smaller cavities. In the early cases the cavities are filled with the typical cheesy débris, the result of the destruction of the kidney parenchyma, each cavity being limited by a capsule. In older cases the entire kidney is converted into a series of cavities, each containing a putty-like substance, the result of further changes in the caseous detritus. Not infrequently phosphatic deposits form on the walls of these cavities. The infection may remain limited to the kidney itself, or spread rapidly toward the capsule, later involving the tissues around the kidney, forming a perinephritic abscess or a fistulous tract which may open anywhere in the vicinity of the kidney.

If allowed to progress, an extension of the tuberculosis to all layers of the pelvis, to the ureters, and to the bladder takes place, upon the mucous surface of which tubercles form and ulcerate, while externally the process excites a periureteritis, with irregular thickening of the ureteral wall. As a result of this ulceration and infiltration stricture formation takes place in the ureter.

Braasch(4) has emphasized, in connection with the pathology of tuberculosis of the kidney, the determining influence of strictures of the ureter, their situation, number, and character. Thus, if the first stricture lies near the bladder, a varying dilatation of the ureter above it and of the renal pelvis will necessarily follow, depending on the degree of the constriction. If the first stricture is in the upper ureter, there may be multiple strictures below it. If the ureter becomes closed early, a large pyonephrosis may result; if later, a caseated remnant of the kidney may remain.

Depending upon the general condition of the patient, a real effort is made to wall off the kidney process, leading toward a spontaneous cure. This effort was shown in Case I, and was accomplished, as far as any active process was concerned, in Cases II and V.

The symptoms of renal tuberculosis are almost entirely urinary, and are due to active pelvic, ureteral, and vesical lesions originating in ulceration of the primary renal focus into the renal calyx or pelvis, with the resultant discharge of tubercle bacilli into the urinary stream. The mere presence of a tuberculous lesion in the renal parenchyma causes no symptoms.

Frequent, painful urination is most often the first symptom, and

is usually present so long as drainage of the renal focus is maintained. It is to be borne in mind, however, that frequency may be due to toxic nephritis on one side resulting from the absorption of poisons from the tuberculous kidney on the other side. In Case V there were no urinary symptoms.

The intermittent character of the urinary symptoms is thus seen to be due to the drainage of one cavity, followed by the absence of bacilli in the urine, the healing of secondary pelvic and vesical lesions and their recurrence when a second pocket breaks through, reinfecting pelvis, ureter, and bladder. This was noted in three of the cases.

Renal colic may result from the passing of blood clots, cheesy débris, or phosphatic deposits, as in the second case. Autonephrectomy may occur from slow ureteral occlusion.

When the lesion is apical, the ulcerated area, being close to the pelvis or calyx, remains open, and the urinary symptoms are sudden in onset, severe, and apt to be ushered in with hematuria, as in Cases III and IV.

Pain in the loin may result from renal colic, renal distention, perinephritis, or dragging on a shortened and thickened ureter.

The general health of the individual usually shows progressive impairment, but remarkably good health may be maintained. Even when the active process has become arrested, as in Cases II and V, the poor drainage of the cavities left by the kidney destruction will result in a mild periodic general toxemia from absorption of retained secretion, as in Case V.

Enlargement of the kidney may be appreciable, and tenderness may be noted, especially in the costovertebral angle.

From the foregoing pathological and symptomatological considerations, the importance as well as the difficulty of diagnosis of renal tuberculosis can be appreciated. Its presence should be suspected in any long-continued history of frequent, painful urination. With the perfection of cystoscopic technic it would seem that the diagnosis should be comparatively simple; but the intermittency of the drainage, the character of the pathological lesions present, when drainage of the kidney focus is maintained, *i. e.*, a highly irritable bladder, which is distended with difficulty, edema of the mucous membrane, which often obscures the ureteral orifice, or bladder lesions resulting in distortion, and finally ureteral stricture interfering with catheterization, make the cystoscopic manipulation the most difficult of all conditions encountered, and often result in success only after time and extreme patience have been employed.

I am convinced that a positive diagnosis may be made in every case if one is willing to take the necessary time and care. The writer has seen the most unfortunate results from hasty diagnosis and proceeding with incomplete data. Repeated ureteral catheterization and a pyelogram may be necessary for a diagnosis in cases showing long remissions. Rest and internal medication should be given for a considerable period of time in order to allay the acute inflammation sufficiently to make the instrumentation possible, in those cases presenting severe symptoms.

By diagnosis I mean the detection of renal tuberculosis, its localization, and estimation of the separate kidney function. Physical examination is often of little value in making a diagnosis of renal tuberculosis. The lower end of a thickened, tender ureter may be palpated per rectum, and almost always through the vaginal vault. This examination should always be made. Cutting down on both kidneys and direct examination of each kidney may be necessary, and is advisable if other means fail. A case seen by the writer, in which ureteral catheterization was impossible owing to an obstruction in the lower end of each ureter, due to a crossing of the ureters after leaving the bladder (the left ureter going to the right kidney, and *vice versa*), in whom the better of the two kidneys was removed, might have been saved had this been done.

For more than thirty years after the recognition of tuberculosis of the kidney by Payr, in 1841, the treatment of this affection was confined to the domain of internal medicine. When Peters(6), in 1872, first performed nephrectomy in a case of tuberculosis of the kidney, the operation was a very rare one for any condition, as may be judged from the title of his article reporting the case. Quoting from the autopsy report, Peters says: "This condition is described by most writers as primary infiltrated tuberculosis of the genitourinary organs." Despite the fatal outcome of this case, the treatment of tuberculosis of the kidney was gradually shifted from the field of medicine into that of surgery. So extensive had this change become in the next twenty years, that nephrectomy for tuberculosis of the kidney was pronounced "an error of the times" (7). "Men have been found," it was stated, "who would perform this operation."

Such warnings from the more conservative element of the medical profession did not serve to check the swinging of the pendulum in the direction of the surgical management of tuberculosis of the kidney, as may be judged from a partial review of the periodical literature for the past five years.

The status of the medical treatment of renal tuberculosis for the five years following the International Urological Congress, held in Paris, in 1908, was reviewed in 1913(8), when the animated controversy regarding the mode of management of these cases was at its height. The results with the various nonsurgical methods mentioned in this review (dietetic and hygienic measures; radiotherapy; heliotherapy; tuberculin treatment; treatment with the immunity bodies of Spengler, etc.), have not served, it will be seen, materially to alter the view that "nephrectomy, the sooner the better," is the method of choice in the presence of unilateral renal tuberculosis. For, as this reviewer states, operating surgeons, led by Albarran and Israel, are unanimous in demanding, under such circumstances, the early performance of nephrectomy.

Thus we find Morson(9) teaching his students at Middlesex Hospital, 1912, that "the 'watch and wait' treatment which is advocated by some surgeons only spells disaster and misery to the unfortunate patient." In bilateral renal tuberculosis, and in cases in which the disease is present elsewhere, he recommended conservative treatment, nephrectomy being confined to cases in which the disease is located in one kidney.

In this connection, too careful a study of the tuberculous patient cannot be made. Whether tuberculosis of the kidney is a primary lesion is still a question, and a thorough search should be made for active or latent foci in other parts of the body.

The recognition of such foci is most important in outlining a plan of treatment for renal tuberculosis. I have seen a general miliary tuberculosis light up after nephrectomy in three cases, and latent foci appear in the lungs, lymph nodes, and epididymis in many others.

This leads the writer to advise the placing of the patient in the best possible condition before operation, by rest, nourishing diet, tonics, increasing elimination, the administration of a nonirritating urinary antiseptic; the adoption of an operative technic by which the kidney is removed as rapidly and with as little traumatism as possible; the destruction of foci in the ureter by injecting pure carbolic acid; anchoring the ureter in the lower angle of the wound; closure of the wound; and again treating the patient for a prolonged period as a case of pulmonary tuberculosis would be treated.

If this procedure is followed, the patient will come to operation with more bodily resistance, the operation will take less of his vitality, and dissemination of the disease following operation will be less likely to take place. This point is well demonstrated by the

second and fifth cases reported. The active disease was arrested in these cases, and the nephrectomy was attended by no more reaction than would have accompanied the removal of a cyst.

In inoperable bilateral renal tuberculosis it is surprising to see how much may be accomplished by general hygienic treatment. A most striking case of this class was seen by the writer six years ago. The patient, a man of twenty-eight, presented an advanced tuberculosis of both kidneys and bladder, with extensive destruction of kidney tissue, as shown by functional tests. His symptoms were most distressing. The passage, every fifteen minutes, of thick, bloody urine, was accompanied by great tenesmus. His general condition was bad. He was sent to the mountains to be treated as a case of general tuberculosis, and given santalol to relieve his urinary distress. The patient is now alive, in very fair general health, his urinary symptoms are slight, retention of urine for three or four hours is often possible, and he is able to follow his profession, which, fortunately, is that of a writer, requiring no physical exertion.

The tuberculous patient is to be regarded as one who must use every atom of his physical force to limit the activity of the tubercle bacilli. Anything which uses up this fighting force, be it due to the activity on the part of the patient or to the reaction resulting from treatment, must have a deleterious effect. This must be continuously borne in mind in preparing patients for operation, in following them after operation, and in treating inoperable cases. The writer is convinced that many cases of tuberculosis of the lower urinary tract, epididymitis, prostatitis, and vesiculitis, appearing after nephrectomy, could have been prevented had this fact been borne in mind.

In this connection a note should be made with regard to the administration of tuberculin. Much has been said for and against its use, latterly mostly against it. It seems to me that tuberculin is often beneficial, if given in such small doses, so slowly increased, that a reaction is obtained which is not sufficiently pronounced to lower the patient's resistance. So often the efforts of nature are not properly gaged, and in attempting to hasten the progress, the feeble, but constantly increasing, assistance is lost, and the treatment is condemned and cast aside.

Bernard and Heitz-Boyer(10), upon the basis of their findings, maintain that, with the exception of those cases in which nephrectomy is not possible, the treatment of renal tuberculosis consists in the removal of the diseased kidney, as soon as the diagnosis is established. In cases of uncomplicated unilateral renal tubercu-

losis they hold that nephrectomy is indicated, not only as a last resort, but as an early and adequate measure. Nephrectomy alone can cure the patient completely and reliably. Its early performance increases the prospects of obtaining such a cure, protecting the patient against vesical complications, recurrence in the other kidney, tuberculous generalization, etc., more effectually than when it is done late or omitted altogether. Tuberculin treatment, in the opinion of these authors, has no place in the treatment of unilateral renal tuberculosis, not even after nephrectomy.

Parkinson(11), in presenting a case before the Royal Society of Medicine, 1913, expressed himself as inclined not to operate, inasmuch as the kidney had shrunk so much under medical treatment, and the patient, a boy of eight years, had gained in weight. He asked for an expression of opinion from those present, and was advised to operate, one member suggesting preliminary treatment with tuberculin.

Braasch(4), summarizing the results of operation in 203 cases of renal tuberculosis, says:

> Six (2.9 per cent.) of the 203 patients operated on died in the hospital. Excluding the cases of those patients operated on during the past year as being too recent to be of statistical value, we were able to obtain the subsequent histories of but 70 per cent. of the patients. Of this number, 18 per cent. were reported dead. Of this 18 per cent., 60 per cent. died during the first year after operation, and 15 per cent. lived more than three years. Of the 82 per cent. alive, all but 13 per cent. reported improvement on recovery from their previous bladder symptoms. The majority of those reporting no bladder improvement had gained in weight and strength.
>
> The length of time elapsing before the bladder symptoms were relieved varied from a few weeks to five years after operation, 67 per cent. in less than a year. Seventy-five per cent. of those patients reporting no improvement in their bladder symptoms gave a history of bladder infection of more than two years' standing. The operative wound was reported healed in less than three months by 43 per cent. of the patients, and in less than a year by 87 per cent. The sinus persisted as long as four years in one case. . . . Ureterectomy did not seem to affect the after-course materially. In the fourteen patients in whom ureterectomy was done with the nephrectomy, the sinus persisted fully as long as in the others.
>
> Of five patients in whom the diagnosis of bilateral tuberculosis was made and substantiated on exploration, and in whom the more diseased kidney was removed, all were reported dead within a year after operation. While our results in operating for bilateral tuberculosis are not so satisfactory as those noted by some observers, the operation may occasionally be followed by cure.

Operative mortality is, therefore, a negligible factor in nephrectomy for renal tuberculosis. We can expect a permanent cure in fully 75 per cent. of patients operated on. On the other hand, if otherwise treated, fully 90 per cent. must eventually succumb to the infection and in taking the small chance for such a cure the risk of infecting the bladder in other foci is greatly increased.

Braasch(12), in another communication of the same year, gives the following reasons for delay in seeking surgical relief for renal tuberculosis:

(1) The true nature of the disease still too frequently remains unrecognized by the general practitioner; (2) it is not generally known that surgery is the best means to cure tuberculosis of the urogenital tract; (3) there exists a widespread belief that renal tuberculosis can frequently be cured by means other than surgery, particularly through the use of tuberculin. . . . While it may be true that incipient renal tuberculosis may occasionally recover spontaneously, it has been our experience that such a case is so exceptional that it must not be relied upon.

Of 283 cases (up to January 1, 1912) diagnosed as renal tuberculosis, Braasch continues:

Two hundred and twelve patients have been operated upon, leaving 71 who were not operated upon. Of those not operated upon, we were able to trace 48. Ten patients were reported alive; 2 between five and ten years, 4 more than one year. Of this number, we have found but 3 in whom the tubercle bacillus has disappeared from the urine and in whom the vesical symptoms have ceased. Two of these cases are of less than five years' duration and the third is of eight years' duration. It is of interest to note that the three patients were young adults, less than twenty years of age, in whom the progress of the disease is usually more rapid than in patients above forty. There are left then 38 patients who are known to have died, or a nonoperative mortality of 80 per cent. . . . Of those regarded as inoperable, our records show 26 patients in whom both kidneys were infected. Twenty of these gave a distinct history of infection in the second kidney from two to ten years after the first kidney became diseased. Although we advised twelve of the latter to try tuberculin, all with one exception have since died.

Rovsing(13) expresses the following very positive opinion regarding the treatment of this disease:

In recent years, the conception of the prognosis has become so optimistic that several authors maintain that early cases of kidney tuberculosis ought to be treated conservatively—by dietetic measures and with tuberculin—while nephrectomy should be allowed only in very advanced unilateral cases.

In my opinion this doctrine is wrong and very dangerous. First, because we never know whether the case is early or advanced, malign or benign. Behind the slightest, most veiled symptoms the most advanced, the most malignant tuberculosis may be hid, as recently proved by some of my cases. Second, there exists no convincing case of tuberculous kidney cured by conservative treat-

ment. As now the statistics have established that we, by nephrectomy, can save 75 per cent. of all patients operated on, it seems quite clear that nephrectomy is indicated as soon as we have diagnosed a unilateral kidney tuberculosis. In spending the time on conservative treatment you run the risk of spreading the tuberculosis to the bladder and to the other kidney, and thereby destroy the possibility of a radical cure.

Eisendrath(3), from a study of nearly 1500 cases operated on, including a number of his own, concludes that, in unilateral renal tuberculosis, the operative mortality, in the early months of the disease, is only a little over 2 per cent., and that the late or remote mortality (first five years) is not much higher. "Even in the latter," he holds, "the mortality is far less than it would have been if the condition had remained unrecognized or not subjected to operation." He further concludes that "no authentic case of tuberculosis of the kidney exists, which has recovered under similar, *i.e.*, nonoperative treatment, without complete loss of function of the kidney."

Kapsammer(14), in an extensive discussion of renal tuberculosis from various points of view, makes the statement:

The operative therapy is the only rational treatment that can be considered at the present day in tuberculosis of the kidney. . . . . We know to-day that in primary tuberculosis of the kidney which, as a rule, is unilateral, a nephrectomy brings about a definite cure, as long as the other kidney is healthy. We also know that when lesions occur in the other kidney, an operation on the diseased kidney is not so definite in its results, as far as a cure is concerned, but we do not know under what conditions lesions in the other kidney remain in abeyance. Therefore, it follows, that when a diagnosis of the existence of a tuberculosis of the kidney on one side has been established, that fact forms an indication for an operation and the removal of the diseased kidney.

Keyes(2) in discussing two cases which had remained entirely without symptoms for two and six years, respectively, at the end of which periods the symptoms returned, and nephrectomy was performed, says: "As we look at these two specimens, I think we may anticipate the day when specimens similar to these shall be made the basis of a plausible but entirely unwarrantable pathological attack upon nephrectomy for the cure of renal tuberculosis."

Renton(15) in giving some case reports, with comments, adds his opinion to the list of those who hold that if one is sure the disease is renal, that it is unilateral, and that the other kidney is healthy, nephrectomy, "the earlier the better," is indicated.

Cabot(5), introducing a study of end-results made by Crabtree, says:

> The tendency to watchful waiting which was generally but another name for medical procrastination, has considerably abated and there is practically no difference of opinion, among those qualified to express one, that in unilateral renal tuberculosis operation offers the only chance of cure and the so-called medical treatment only prolongs the agony. . . . The scientific world is waiting for proved cases of renal tuberculosis healed permanently, except by removal of the kidney, either by nature or by art.

Kilbane(16) states unequivocally that "nephrectomy is the logical treatment for uncomplicated unilateral cases, as soon as a diagnosis is possible."

Cabot and Crabtree(17), in another study of renal tuberculosis, among other renal infections, state that "cure results only by removal of the whole kidney, either by nature (caseation) or by art (nephrectomy)." They purposely omit a consideration of the treatment of renal tuberculosis, "because it consists wholly in the removal of the kidney when the diagnosis has been made."

Dock(18), closes his contribution to a symposium on tuberculosis of the kidney with the laconic statement: "Extirpation of the affected kidney is at present conservative treatment." His views concerning the possibility of spontaneous healing in this disease will be discussed later.

From the foregoing opinions, selected from the writings of a representative list of surgeons and urologists, it may be judged that the observers quoted advocate the taking of no chances on the basis of the possibility of the spontaneous healing of the tuberculous kidney, and little more on the ground of possible improvement under nonsurgical treatment.

Heitz-Boyer(19), for example, warns against accepting the so-called "spontaneous cure" of a tuberculous kidney—which consists in an exclusion of the diseased kidney—as a curative process in the true sense of the term. A tuberculous focus cannot remain in the body for years without causing harm. Aside from the fact that the process of seclusion itself favors the lodging of tubercle bacilli in the other kidney, an important pathological part is played by the stenosis of the efferent urinary passages, which precedes the exclusion of the kidney, and results in stagnation.

There are cases, this observer states, in which absolutely clear urine is secreted, by means of ureteral catheterization, from a kidney known to have been positively tuberculous in the past. Such

cases serve as an argument in favor of the view that internal treatment, *i.e.*, specific treatment, is capable of curing renal tuberculosis with preservation of the renal function. These cases, he points out, are very exceptional, however. Among 150 cases collected in a circular inquiry, together with Bernard, Heitz-Boyer found only one case in which clear urine was voided from a previously tuberculous kidney, after its treatment with tuberculin. Similar observations have been made by other investigators. According to the findings of Heitz-Boyer, in anatomical preparations, these cases do not represent a cure of the diseased portions, but a seclusion of these from the remaining healthy part of the kidney parenchyma. The rarest of all communication between the tuberculous focus and the renal pelvis leads to the appearance of clear urine, secreted by the healthy remnant. A regional, partial development of renal tuberculosis, and the resulting partial seclusion, which may concern one or more renal segments up to half of the kidney, may in rare cases lead to a condition which can be interpreted as a cure with preserved function. However, this is not really a cure, he warns, but a partial elimination of the organ. Meanwhile, the closed pathological foci represent a constant and serious danger for the patient, so that even the apparently most conclusive and best supported results obtained by conservative treatment, possess only a very doubtful value. The process of exclusion of a tuberculous kidney, while it explains the retrogression of the urinary disturbances, cannot be regarded as a curative process in the real sense of the term.

These remarks are well illustrated by Cases II and V, cited above.

Harbitz(20) expresses a more positive view regarding the possibility of spontaneous healing, which he considers a not uncommon occurrence. In autopsies, he states, it is not uncommon to find evidence of a slow spontaneous cure, in the form of completely encapsulated lesions of the kidney, which are first discovered as accidental postmortem findings. In many of these cases the renal tuberculosis has taken a chronic course (four to twenty years, in this author's material).

Sometimes, according to Harbitz, there is a picture of a "sclerotic" inflammation, the fibrous transformation and healing tendency preponderating so markedly that it is very difficult, if not impossible, to decide from the macroscopical appearance whether a tuberculous inflammation is present or not. In other cases, there is a completely encapsulated chronic renal tuberculosis, where the inflammation has been arrested and the discharge of pus through the ureter has stopped. The cure may be so complete that a tuberculous in-

flammation in the remnants of renal tissue can be demonstrated only on careful microscopical examination (as in Cases II and V cited above). In still other cases, even the microscopical evidence is missing, as in one of Harbitz' cases, and the diagnosis of renal tuberculosis being cured by encapsulation can be rendered only on the basis of the entire macroscopical picture and the remaining autopsy findings.

Morris(21) asks the question "How often do patients recover spontaneously from tuberculosis of the kidney?" which forms the title of a contribution in connection with a case in which treatment for increasing resistance seemingly produced a cure. This case recalled to his mind some experiments of his, a number of years ago, planned with the idea of determining if tuberculosis of the kidney could be brought to a stop by ligating the renal artery for the purpose of limiting nutrition, or by ligating the renal vein for the purpose of causing hyperemia, in order to obtain an effect in line with the work of Bier. Rabbits were injected with virulent cultures of test-tube culture human tubercle bacilli, the injections being made directly into the parenchyma of the kidney in some rabbits, and simply beneath the fibrous capsule in others. The abdomen was opened in about a month, when the tuberculosis was found well under way, and closed again for further development before ligating the renal arteries and veins. Not being able to follow the experiments again promptly, it was noted that rabbits which had shown various signs of illness were getting better. When the abdomens were finally opened (it is not stated how long after the commencement of the experiments), the tuberculosis had come to an end in some cases and nearly to an end in others. The rabbits finally recovered completely. "If these rabbits," comments Morris, "depending upon their own resources, allowed tuberculosis to get well under way, and then placed it under control with their own factors of protection, it is a question if some of our patients with tuberculosis of the kidney will not be quite amenable to those resources which increase the general resistance of the patient."

O'Neil and Hawes(22) in line with this view, hold that "careful and constant supervision prior to any surgical procedure will vastly increase the benefit of such procedure and that this is particularly true in urinary and genital tuberculosis."

Dock(18) says, regarding the possibility of spontaneous healing: "The question in renal tuberculosis is important because if spontaneous healing is not probable in general, medical treatment, no

matter how complete, is at present less promising than extirpation, if extirpation is possible."

Young(23) who followed Dock in the symposium on renal tuberculosis, said: "None of the reported cases on close examination fulfill all of the requirements necessary to establish definitely the proof of a cure, and many of them do not have all of the data possible to obtain during life."

Referring to the immunizing treatment advocated by many, Young says:

"If we reverse this evidence we find in it a very strong suggestion that there is no process going on in the body in this disease which has any marked tendency to cause healing, or else the immunizing process would not be necessary. . . . This seems to me to be the keystone to the whole question. If a person has a strong natural immunity to start with, an initial infection will not gain a foothold. If a process does start in the kidney, the slow course of the formation of antibodies in comparison with the spread of the lesion allows the disease to get beyond the point where it can be entirely obliterated, although it can often be walled off so efficiently that the symptoms cease and the condition becomes latent but capable of further mischief if for any reason it gets loose."

From a study of the cases reported in the literature, from pathological study, and from reasoning in connection with immunization, Young concludes that "the healing of a tuberculous focus in the kidney is impossible."

The foregoing rather extensive review of the literature on renal tuberculosis for the past five years has been made, and exact quotations taken from the various writers, in order that a present-day analysis might be made of this important disease and its proper management.

The past five years represent the highest development in urological progress, due largely to the accurate study of cases, the placing of urology on a par with other specialties, and the closer association of the urologist with those in other branches of medicine and surgery.

The observations of the writer, from his own cases and those studied in conjunction with others, coincides, in the main, with the opinions of the writers who have contributed to the subject during the past few years.

CONCLUSIONS.

The present status of renal tuberculosis may be summarized as follows:

1. Renal tuberculosis may be a primary lesion and arises from a filtration of tubercle bacilli from the blood stream into the paren-

chyma or tubules of the kidney, where tissue changes similar to those found in tuberculous foci in other parts of the body, take place.

2. An effort is always made to wall off the process, but the formation of antibodies is so slow, and the immunity of the patient, which may have always been absent or which may have been temporarily diminished, is so low that the lesion usually gets beyond control, and usually goes on to wide destruction of the kidney and extension to the other kidney, to other parts of the urinary tract and of the body.

3. From the nature of the lesion, remissions are common.

4. The symptoms of renal tuberculosis are misleading, often slight at the onset, and give no indication of the extent of the lesion.

5. The diagnosis of renal tuberculosis may be simple or the most difficult of all urinary lesions, often requiring preliminary treatment to allay acute symptoms and repeated cystoscopic examinations over a long period of time.

6. The treatment cannot be outlined from a study of the symptoms. The remission of symptoms, often for long periods of time, should not be accepted as a cure.

7. The effort on the part of nature to inhibit the progress of the disease and to limit the lesion should be borne in mind, utilized and encouraged in every possible manner in inoperable cases, as well as before and after operation.

8. While this review shows that many others have had cases similar to two of the writer's, where the active tuberculous process has been arrested and walled off, still this is not the rule, the lesion being progressive. Even when arrested, a kidney the site of poorly drained cavities is a menace to the system. Therefore, nephrectomy for unilateral renal tuberculosis is the proper treatment.

9. With the means at hand by which we can often make an early and accurate diagnosis of renal tuberculosis, and with our statistics showing that 75 per cent. of the cases of unilateral infections are cured by nephrectomy, the tendency is to be too optimistic as to the future in these cases. They should all report regularly, be watched and treated as cases of general tuberculosis.

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A TECHNIC FOR SEPARATING THE SIGMOID AND UTERINE ADNEXA WHEN FUSED BY INFLAMMATION.*

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BEFORE dealing with the subject proper to be discussed in this paper, a few lines of introduction relative to the relation that the sigmoid colon bears to the female generative organs may be pertinent.

The sigmoid is the narrowest part of the colon, beginning at the termination of the descending colon, at the margin of the crest of the ilium and ending in the rectum, opposite the left sacroiliac symphysis. Treves says that the sigmoid extends to the third sacral vertebra, thus including the upper part of the rectum. The sigmoid colon lies in the pelvis completely and rises above the true pelvis. It does not lie in the iliac fossa as some have described it. The exact knowledge about the position of the sigmoid has been gained in recent years, by Röntgenologists, through extensive *x*-ray studies. The sigmoid colon is about 18 inches long and when distended may fill the whole true pelvis. Not alone the whole pelvis but it can rise out of the pelvis into the lower abdomen owing to its long mesosigmoid. In the pelvis it lies in contact with the bladder, the uterus and its appendages and those coils of the small intestines which occupy the pelvis. It is completely surrounded by peritoneum, and is held in position by the mesosigmoid, which includes what is also spoken of in many books as the mesorectum. The psoas muscle, external iliac vessels, spermatic vessels, and ureter, lie behind the sigmoid flexure. The resistance offered to the return flow of blood through the left spermatic vein, produced by pressure of the sigmoid flexure upon that vessel in persons of constipated habits, forms one of the reasons given for the more common occurrence of pelvic varicocele upon the left then upon the right side. The sigmoid flexure forms a loop which resembles the Greek letter Omega, rather than the letter S, and therefore it is also called the omega loop.

At the rectosigmoid junction there is an abrupt bend, the recto-

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sigmoid curve. This very abrupt bend is due to the fact that the movable portion of the sigmoid drops into the pelvis by gravity over the fixed and immobile rectum. It is this curve which makes it difficult, to pass a long rectal tube into the sigmoid flexure. This abrupt rectosigmoid curve can be partially obliterated by placing the patient into the knee-chest position, or in the Trendelenburg position.

In tracing the course of the sigmoid flexure of the colon, it will be seen that the organ is a movable portion of the large intestine lying between two relatively fixed points. One is at the point where the descending colon ends, at the outer border of the psoas muscle on the left side, and the other fixed point is at the rectum, where the sigmoid ends. This movable portion of the gut may assume various shapes and forms, but as a rule it is the shape of the greek letter omega. The course of the sigmoid may be described as follows. Leaving the descending colon, it crosses the psoas muscle and external iliac vessels nearly at right angles, then descends vertically into the pelvis, extends on the floor of the pelvis toward the right, then turns on itself, passes the median line and terminates in the rectum. The mobility of the organ depends entirely on the relative length of the mesosigmoid. The line of attachment of the mesosigmoid follows the general direction of the flexure and having reached the upper border of the third sacral vertebra it becomes lost in the posterior peritoneum to pass over the rectum which becomes a fixed organ.

When the sigmoid flexure becomes distended with gas, it rises out of the pelvis and enters the lower abdomen. As the organ is capable of great distention, it may form quite a conspicuous mass which becomes easily palpable and may lead one to a mistaken diagnosis unless one bears in mind of the possibility of such an occurrence. In older people fecal impaction in the sigmoid is very apt to occur, forming palpable masses in the lower abdomen. The sigmoid colon lends itself readily to palpation, whether in the distended or collapsed state. Under favorable conditions, such as in thin people or with patients who are able to relax the abdominal parieties completely, even small growths in the sigmoid can be readily palpated. Small tumors in the upper rectum or lower sigmoid reveal themselves to bimanual palpation with the finger in the rectum. Attention may here be called to the fact that in the female, carcinoma of the terminal sigmoid may be mistaken for a neoplasm of the ovary, or vice versa the mistake arising on account of the fact that the sigmoid is a true pelvic organ. This fact also makes it imperative to

have the rectum and sigmoid unloaded in making gynecological examinations.

The blood supply of the sigmoid is from the sigmoid arteries, from one to three in number. These vessels are branches of the inferior mesenteric artery. These branches pass downward and to the left, enter the mesosigmoid and divide into ascending and descending branches which form arterial arches with the adjacent arteries. The upper one of these branches anastomoses with the descending branch of the left colic artery, which is itself a branch of the inferior mesenteric artery, the lower one of these sigmoidal arteries anastomoses with the superior hemorrhoidal artery, which is the terminal end of the inferior mesenteric artery.

The sigmoid colon frequently plays a most important rôle in the inflammatory diseases of the uterine adnexa. When the invading organism reaches the pelvic peritoneum, an inflammatory reaction occurs and an attempt is made on the part of nature to limit the spread of the invading host by a process of adhesion of the peritoneal surfaces, so irritated. Practically every case of pyosalpingitis has more or less adhesive peritonitis as a complication. The tubes and ovaries when diseased become adherent to structures in the true pelvis. Under these conditions, what then is more natural but that the pelvic colon should share in this defensive warfare between the invading microörganism and the protective peritoneum. Not only the sigmoid but even the rectum and cecum share in the protection of adhesions in the inflammatory disease of tubes and ovaries. Anatomically the sigmoid colon is well situated for the purpose of holding tubal infection in the true pelvis, and preventing its further spread to the general peritoneal cavity. Like the rectum, the sigmoid is a true pelvic organ, and when empty, after complete bowel movement, it falls back into the pelvis in a collapsed state. This organ is in constant contact with the uterine adnexa and plays a very important part in the function of defecation.

The sigmoid is in constant contact with the uterus, tubes and ovaries and hence we see this organ implicated with all cases of tuboövarian infection. Some years ago in a paper read by J. R. Pennington, of Chicago, entitled "The Sigmoidal Factor in Pelvic Disease" (*N. Y. Medical Journal*, May 23, 1908), the author tried to prove that many cases of utero-ovarian disease was the result of disease in the sigmoid colon. That in rare cases the sigmoid disease may be a factor in tuboövarian infection cannot be denied, but in the preponderant number of cases the pathology is in the reverse order,

namely, the infection is first in the adnexa and that the sigmoid becomes secondarily involved. The author says:

"Autopsies show that the sigmoid may overlap, wind around, rest beneath or on the pelvic organs, and that it may be adherent at various points. Such a condition not only compromises its function, but those of the uterus and its adnexa. The uterus when sustaining such relations to a chronically loaded sigmoid, may be displaced upward, downward, laterally, backward or forward, and held or fixed in that position. This interfers with its mobility and function, hence produces a pathologic state of that organ. If the uterus is continuously held or fixed in any relative position whatsoever, be that position anteverted or otherwise, and whether it be by tumors, or overloaded or adherent bowel, or what not, it must sooner or later become conjected and the victim of infection."

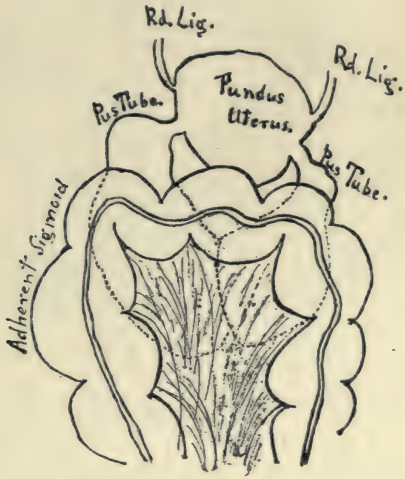

FIG. 1.

Adhesions of Sigmoid.—In laparotomizing patients with diseased adnexa adhesions of the sigmoid to the Fallopian tubes and ovaries are encountered in a very large number of cases. (Figs. 1 and 2 are drawings of sigmoid adhesions as they appeared when the abdomen was opened—Hospital Nos. 19228 and 19931 respectively.) In the chronic cases of pyosalpingitis the adhesions are usually more or less thin bands that tear readily under the manipulating fingers. In a small proportion of cases these adhesions are of a more tough nature requiring to be cut, while in others the union of the sigmoid to the affected organs is so intimate that they cannot be separated without seriously injuring the wall.

In 1910 I encountered an exceptionally interesting case of this kind (Hospital No. 5192). The history of the case was as follows:

Mrs. L. D. aged twenty-nine. She has had four miscarriages, all induced. Diagnosis pyosalpinx. Operation Dec. 16, 1910. Abdomen opened in the midline below umbilicus. Tuboövarian mass on the right side firmly adherent to the sigmoid. Great amount of thickening of the colon. In this case the whole length of the Fallopian tube and that of the ovary were so firmly adherent to the sigmoid that it would have been impossible to separate them. A technic was than adopted which has been followed in many similar

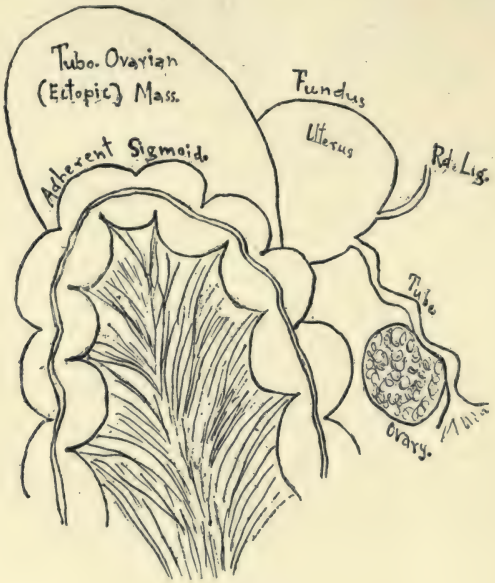

FIG. 2.

cases and always with uniform success. The technic is a very simple one, namely to free the bowel wall of sigmoid, intestine or cecum, by cutting it away from the adherent organs, at the expense of the parts to which they are adherent, in such a manner that the cut comes nowhere near, even within the vicinity where the bowel wall could sustain injury. If this principle is followed, large masses of tissue will remain hanging on the wall of the gut. This is the deliberate purpose of the technic. No point of cleavage is sought for in separation of the bowel. As soon as bowel wall is identified, the diseased tube or ovary as the case may be, is cut into until the bowel is mobilized, taking no regard of how much of the diseased tissue remains attached to the sigmoid. Very frequently these tabs of tissues will bleed quite freely but this can be easily controlled by ties and sutures, as shown in Fig. 3. When this technic was first

adopted, I was much concerned about possible complications. The postoperative course of every one of the cases so treated was followed up carefully. No complications occurred as a result of the procedure, and I can speak with confidence of the technic. It does not make any difference how much of tissue is allowed to remain on the gut as long as there has been no injury to the bowel wall and the lumen was not entered. Whether these cases will result in a large amount of adhesions or whether there will be a greater amount of adhesions than in the cases where the bowel separation is made at a point of cleavage, is impossible to state, as I have not had occasion to reopen the abdomen in any of these cases treated by this technic. I am, however, quite sure that the cases treated by this technic have made smoother recoveries than cases treated otherwise, and what is more

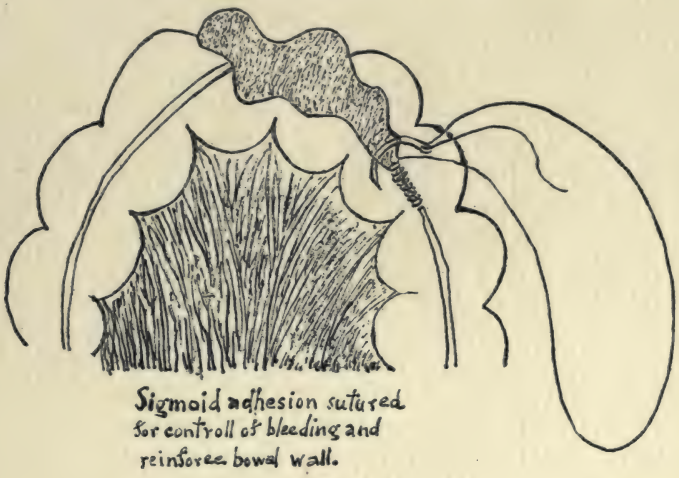

FIG. 3.

important, there has been no mortality in these cases. This same technic holds good for those cases of tubercular salpingitis where the adhesions are so dense that the entire pelvic contents is fixed as if glued together. One may, so to say, hack away at the diseased tissues as much as is necessary, providing the bowel is saved from injury and is freed from the diseased adnexa. The ragged mass of tissue left on the bowel wall will do no harm. The above technic was used in the following case (Hospital No. 15512).

Median incision below the umbilicus. Peritoneum entered and it was found that the bladder wall has been adherent in front to the inflammatory tumor and uterus, and the sigmoid was found adherent posteriorly to the entire tumor mass. No line of cleavage was sought. Intestines and sigmoid were identified in the tumor mass made up of a tuboövarian abscess on the left side. In enucleating the mass the uterus was cut in several places leaving a ragged uterine wall. The adherent tube was cut away from the bowel wall.

A supravaginal hysterectomy was performed removing the entire ragged uterus. The sigmoid was saved from injury, drainage inserted, complete recovery.

Injury to the sigmoid when it is fixed in the pelvis by inflammatory adhesions is a very serious complication of the operation. I know that fatalities often result from this complication. A case comes vividly to mind where in separating the diseased adnexa the cleavage point was asiduously sought for and found. The bowel was apparently not injured at the time of operation. As the patient was in shock, salines by rectum was ordered. Eight hours later the contents of the rectum appeared at the lower angle of the abdominal incision by way of the drainage tract, with a fatal outcome of the case. I am quite certain that the bowel injury could have been prevented, had the above technic instead of the cleavage method been used in separating the sigmoid from the diseased adnexa.

If the sigmoid or loops of the small intestines become adherent to the bladder wall, the separation in the acute case is quite easily accomplished, and the more acute the process, the greater ease with which the adherent surfaces separate. In all these cases where two hollow organs are adherent the cleavage method must be followed, as one is working between two walls of important viscera. The organs torn, either the bowel or that of the bladder, must be repaired by suturing the rent. Observation has shown that both the sigmoid and urinary bladder tolerate injury very well and by repairing these rents the suture line will hold in a very large number of cases. Under all other conditions however, whenever one is dealing with diseased tubes or ovaries adherent to sigmoid, rectum or loops of small intestines, it is to be borne in mind that separating these adherent bowel structures not along their line of cleavage but cutting them away at the expense of the parts to which they are adherent, is always preferable. By adopting this technic the surgeon will have less bowel injuries to deal with, a very important point of consideration. Not alone in pelvic surgery, but in repair of post-operative hernias the same principle holds good. In these hernias when bowel wall becomes adherent to fascia, I have often cut away large pieces of fascia and allowed it to remain on the bowel wall instead of separating the gut by cleavage without causing the least trouble. When I encounter these bowel adhesions in postoperative hernias, I orientate the work in such a manner as to free the abdominal contents from the hernial sac, but always at the expense of the structures to which they are adherent, and never with any ill effect. Pieces of hernia sac, fascia, fat, or omentum, are allowed to

hang on the bowel wall as long as by doing so no risk is run of injuring the bowel wall. These adherent masses of tissue never do any harm. Mrs. K., Hospital No. 20691, was treated in the above manner.

When the technic of leaving pieces of tissue on the bowel wall was first adopted, I was apprehensive, but I can now speak with confidence that they do no harm. The cleavage method of bowel separation must of course be followed if bowel loops are adherent to each other, or if a hollow fiscus is adherent to, but in all other adhesions the technic described will be a safer procedure than the method of separation by cleavage.

In cases of tuboövarian abscesses, when the sigmoid or rectum is involved, cases with thick massive infiltration of the mesosigmoid, and where the abscess cavity is draining into the bowel, the same technic can be adopted. By utilizing the adherent tissue on the wall of the sigmoid or rectum, as the case may be, the rent in the bowel wall can be closed up more readily. The technic of closures of the rent becomes much easier and a more satisfactory suture line can be obtained, than if the bowel has not been separated by cleavage. It is true that in a very large number of cases, where the sigmoid has been adherent to diseased adnexa, and the outer coat has been torn during the liberation, no suturing is required and no harm will result. The cases get along very well as long as the mucous coat of the bowel is not injured and no bad results will follow. Nevertheless it is far better not to injure the outer coat. When the lumen of the bowel has been entered, the complication is a serious one and every attempt should be made to repair the mucous surface as accurately as possible.

In repairing the mucous coat of the sigmoid or upper rectum, the inaccessibleness of these parts calls for thorough exposure and the skilfulness in placing of sutures. There is, however, this much to be said in favor of these serious injuries, that with proper repair of the mucous and submucous coat, the healing power of these parts is phenomenal. Having repaired these injuries, the suture line should be allowed to fall against some surface to which it may become adherent, either the posterior surface of the uterus, the cul-de-sac itself or bowel wall. No drainage material should be placed against the suture line, and certainly no gauze drain should be placed on it. If drainage is called for, it should be placed above the line or to the side of it. Rubber drain is preferable to gauze.

Having repaired the mucous and perhaps the submucous coat of the bowel, the outer coat will admit of a more ready closure if it has also adherent tissue on the wall to include in the suture

line. If the adherent bowel was separated along the line of cleavage and the outer coat of the bowel is infiltrated with inflammatory produce, then the suture will not hold. In such an emergency, it is best to place over the suture line and mucous surface, a layer of omental tissue, and hold in place with a few sutures. When the sigmoid has suffered damage to such an extent as to be beyond repair, resection must be resorted to. This is a serious matter in these cases, because the patient's operative endurance has already been seriously taxed by the operation for the removal of the diseased parts. The added operation of resection of bowel must necessarily call further on the power of the endurance of the patient.

The following is the report of two cases where a tuboövarian abscess was draining into the sigmoid, and when the above outlined technic was used with successful outcome of the cases.

Mrs. K., Hospital No. 20503, was admitted to the hospital in April, 1918. She was complaining of having been ill for some years. She was forty-eight years old, married twenty-eight years, had two children when quite young and several abortions. She was complaining of pain in the lower part of the abdomen, radiating down on the left side on her thighs. She was very neurotic.

For the past two years she has had four attacks of abdominal pain accompanied by fever and chills. The last attack was four weeks ago, from which attack she has not fully recovered. The attacks begin with abdominal pain and vomiting.

The lower part of the abdomen is still very sore. She has a backache which is more or less constant and is not able to get about. For years she has been suffering with vaginal discharge.

She has no urinary symptoms, but previously she has suffered much with frequent urination. Her bowels are constipated and she is subject to indigestion. She often has severe attacks of headaches accompanied by dizziness.

Menses are very irregular, painful and at times very profuse. The pain comes on with the flow with a dull backache and nausea. Heat and stimulants relieve the pain which is apt to last all through her period which usually lasts from five to six days. She often passes small clots and there is always a bad odor with each menstruation. After each period the vaginal discharge is increased and lasts for about ten days after the flow.

About a year ago when she was having the third attack of abdominal trouble she was very sick and had a high temperature. At that time her greatest pain was in her rectum. A few days later pus escaped by rectum and her doctor said that an abscess broke into her bowel. With the present attack she has had no trouble with the rectum but her pain in the lower part of the abdomen was more severe than in the previous attacks.

Physical examination of the chest was entirely negative. Pulse, respiration and blood pressure—normal. Palpation of the abdo-

men revealed the fact that she was tender to touch along the lower part of the abdomen. The tenderness was more marked on the right side, extending well up and beyond McBurney's point. In fact, pain could be elicited at any point in the lower abdomen. No masses could be palpated and both recti were rigid, but it appeared that the rigidity was voluntary.

Bimanually examination showed that the cul-de-sac of Douglas was filled with a very tender mass, hard and unyielding with no point of softening. The uterus could not be mapped out with the palpitating fingers. There were other hard masses in the pelvis, beside the one in the cul-de-sac. The entire contents of the pelvis was very tender to touch. Rectal examination disclosed the same tender mass which was palpable by the vagina, with no points of softening. Through the speculum the cervix looked normal with a plug of mucous in the external os.

A diagnosis of diseased adnexa was made and an operation advised. When the abdomen was opened the following conditions were found. The entire true pelvis was filled with an inflammatory mass involving the uterus and both adnexa. The omentum, several coils of intestines and the entire sigmoid, firmly adherent to the pelvic contents. The peritoneum anterior to the uterus was drawn well over the pelvic contents and held there by inflammatory adhesions. The omentum was liberated from its bed of adhesions; the coils of intestines were liberated by severing the filamentous adhesions. The sigmoid was firmly adherent to a tuboövarian mass which was absolutely immovable in the pelvis. The adnexa were firmly fused with each other and to the uterus as well as to the pelvic peritoneum. The case looked most discouraging. The mass on the left side was aspirated but only a very small quantity of pus obtained. Attempt was now made to mobilize the sigmoid and avoid operative injury to the bowels if possible. In mobilizing the sigmoid the inflammatory mass was cut into and large masses of it were left hanging to the sigmoid wall. At one point the cavity of the tuboövarian abscess was communicating with the bowel lumen. At this point the mucous membrane of the gut sustained a tear the rent extending nearly three-quarters of the circumference of the bowel. A small amount of bowel contents of the gut was spilled into the operative field. The sigmoid was now thoroughly mobilized so as to bring this inaccessible portion of the viscus into better reach for a repair of the rent and closure of the bowel wall. Having accomplished this the injured gut was now protected by pads and the pelvis cleared of the inflammatory masses by the usual technic. All bleeding points controlled and the operative field peritonealized as much as possible.

Having finished the operation the repair of the sigmoid was proceeded with. The rent in the mucous membrane of the sigmoid was sewed with interrupted sutures of catgut, the knots being tied in the lumen of the bowel. Having finished this part of the operation, the closure of the outer wall of the bowel was greatly facilitated by the fact that there was a considerable amount of tissue present

with which to accomplish this. Hanging to the wall of the sigmoid were large amounts of inflammatory tissue originally the wall of the tuboövarian abscess. This tissue was sutured and with it the wall of the sigmoid was closed fortifying the line of sutures in the mucous membrane. Had the sigmoid been separated from the tuboövarian mass by the cleavage method, had there been no inflammatory tissue present, the wall of the sigmoid could not have been closed and a resection would have had to be performed. With the aid of the inflammatory tissue tags on the bowel wall a very serious operation of resection was avoided and a complicated affair turned into a simple procedure.

Drainage of rubber tissue was now inserted but in such a manner as to avoid placing the drain against the suture line. The abdomen was now closed in layers down to the drainage track. Within a few days of the operation the drainage was very free, but the bowel did not leak, showing that the suture line in the bowel held firmly, proving also that the inflammatory tissue is a structure that can be depended on for the closure of rents in the bowel wall.

In my hands the above procedure has been most successulf and I can recommend its adoption with a confidence born of experience. It is a dictum with me, that whenever I find bowel wall intimately adherent to an organ or tissue, such as the uterus or adnexa, the organ or tissue is sacrificed at the expense of the wall of the gut and the inflammatory tissue or part of an organ are freely allowed to remain in the wall of the bowel without any detriment or injury to the gut.

By this technic the bowel wall is saved from injury, a very important desideratum. If the tags of tissue on the bowel wall bleed they are sutured and the oozing controlled. In a very recent case a gangrenous pedunculated fibroid was rolled up into the omentum and also adherent and fused to two loops of small intestines as well as the transverse colon (Hospital No. 22058). The tumor was first severed from the uterus and the bowel loops freed from the tumors by cutting them away in such a manner as to leave large portions of the tumor on the bowel wall and in this way avoiding any possibility of injury to the wall of the gut. Had the cleavage method of separation been followed in this case, the lumen of the gut might have been broken into which would have meant a very serious complication in the operation.

CASE II.—Mrs. D., Hospital No. 20429, was a similar case to the one cited above. Here also a tuboövarian abscess was communicating with the sigmoid colon. The fusion of the inflammatory mass with the sigmoid was absolute and complete. Here also the bowel was mobilized by cutting away the pus sac and leaving large amounts of inflammatory tissue on the bowel wall. When the inflammatory

mass was cleared away and the pelvis freed of disease, there was discovered a large hole in the sigmoid. The mucous membrane was much thickened as was also the meso sigmoid. The repair of the mucous surface was accomplished under great difficulty. The rest of the bowel repair, however, was readily affected owing to the fact that the sac wall served a good purpose for the task at hand. In this case there was a large amount of free pus in the pelvis soiling the pelvic peritoneum. Drainage was placed both by way of the vagina and lower angle of the abdominal incision. The drainage was not placed in contact with the line of incision. The convalescence was very stormy and although the drainage both above and below was very free, the repaired bowel wall held and no leakage occurred. The case cited here convinced me most emphatically that tissue consisting of walls of pus sacs have considerable vitality and that they can be utilized for purposes of repair of injured and traumatized bowel wall, and further that the repaired wall holds in a very large number of cases. Therefore, given a case of diseased adnexa which has become fused to the sigmoid by inflammation, the separation should be accomplished not along the line of cleavage between the two organs, but that the bowel should be freed by cutting the diseased tissue away from it. The bowel is thus freed by a "no-cleavage" method. The tissues allowed to hang on to the wall of the gut will do no harm and if necessary these tags of tissues can be utilized for purposes of repair of the wall of the bowel.

AN ANALYSIS OF 309 CASES OF ECTOPIC GESTATION IN THE WOMAN'S HOSPITAL IN THE STATE OF NEW YORK.*

BY

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(With five illustrations.)

In order to make a correct diagnosis of any pathological condition, it is necessary to arrange facts in an orderly way and to tabulate the history obtained from the patient, the symptoms and the findings upon examination; to have a standard for comparison which should include not only the usual symptoms, but the symptoms which may or do occur less frequently in such conditions. In differential diagnosis it is necessary to have a perspective as it were, of the whole field, that one may know not only the devious paths that the disease may take but to know the other conditions which at times may approach or travel a similar course.

Attention should be given to careful history taking. Symptoms forgotten or not considered important are easily passed over unless the history sheet is printed and questions asked as a routine measure in all cases.

A pelvic examination should be made and due attention given to the pain elicited, but another examination should be made if the diagnosis is doubtful, when the patient is anesthetized in order that this pain element may be eliminated. Conditions may be judged differently at this time and much learned which may be of help in the diagnosis of similar conditions at some future time.

The text-books of gynecology record chiefly the symptoms of the classical case of ectopic gestation. This from its tragic nature is indelibly stamped upon one's mind, but the type, which fortunately is the one more often met with in surgical practice, easily escapes diagnosis until seen at operation.

It is to summarize a number of cases and find, if possible, any symptoms or conditions which are present in all or nearly all cases of ectopic gestation and have a standard for comparison in such conditions that this analysis was undertaken.

While working upon these histories a similar analysis on ectopic gestation was published by Wynne of Johns Hopkin's Hospital and I am indebted to it for many valuable points.

In the ten years beginning January 1, 1909 to January 1, 1919, there were recorded in the Woman's Hospital 320 cases of ectopic gestation. The clinical history and the operative findings bear out this diagnosis, but as the pathologists in eleven cases did not find fetal elements in the tissues, I have not included these cases for

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statistical study, believing with Cragin and Bovée that ovarian and tubal hemorrhage of nongestational origin cannot be differentiated from the hemorrhage caused by an ectopic gestation except by microscopical examination of the tissues.

During this same decade there were 19,674 patients in the Gynecological Service of the Woman's Hospital of which 309 were cases of ectopic gestation, an incidence of 1.5 per cent. The following statistical tables are based on this series of cases and serve for drawing certain conclusions presented at the end of this article.

Ages.—In a series of 262 cases the ages ranged from seventeen years to forty-two years, and 63 per cent. of the series were between the age of twenty-four to thirty-three years inclusive. Three patients were under twenty years and two were over forty years of age.

Social Status.—Of the 309 patients 123 were private patients and 186 were ward patients.

Marital State.—In a series of 196 patients 187 were married, four were unmarried, four were twice married, and one widowed.

Time of Admission after Marriage.

In a series of 136 cases.

	Cases
Under 6 months	3
Between 6 and 12 months	6
Between 12 and 18 months	2
After 2 years	10
After 3 years	14
After 4 years	10
After 5 years	16
After 6 years	10
After 7 years	10
After 8 years	4
After 9 years	5
After 10 years	8
After 11 years	5
After 12 years	8
After 13 years	5
After 14 years	3
After 15 years	4
After 16 years	2
After 17 years	7
After 19 years	3
After 22 years	1
Total	136

Cases Pregnant Previous to Ectopic Gestation.

In a series of 181 cases.

	Cases	Per cent.
Full-term children	121	66.8
Miscarriages only	32	17.0
Never been pregnant	28	15.0

Last Pregnancy (Full Term) before the Ectopic Gestation.

In a series of 100 cases.

	Cases		Case
7 months previously	1	13 months previously	1
8 months previously	1	14 months previously	1
10 months previously	1	15 months previously (twins)	1
11 months previously	1	17 months previously	2
12 months previously	3	18 months previously	1
	—	20 months previously	1
Total	7		—
		Total	7

	Cases
2 years previously	5
3 years previously (twins)	10
4 years previously	4
4½ years previously	2
5 years previously	3
6 years previously	5
7 years previously	2
9 years previously	2
10 years previously	3
11 years previously	2
12 years previously	1
13 years previously	2
15 years previously	2
16 years previously	1
Total	58

Last Pregnancy (Miscarriage) before Ectopic Gestation.

	Cases
12 weeks previously	1
15 weeks previously	1
5 months previously	3
8 months previously	1
9 months previously	1
12 months previously	10
15 months previously	1
18 months previously	1
2 years previously	4
3 years previously	5
4 years previously	2
5 years previously	4
6 years previously	1
7 years previously	2
8 years previously	1
9 years previously	1
10 years previously	1
11 years previously	2
Total	42

A history that the miscarriage had been induced was obtained in 19 of the above cases.

Absolute Sterility (Married Two Years or Over).

In a series of 186 cases.

	Cases
Married 2 years	2
Married 3 years	11
Married 4 years	2
Married 5 years	5
Married 6 years	5
Married 7 years	1
Married 9 years	1
Married 10 years	2
Married 12 years	1
Married 13 years	1
	31 (16.6 per cent.)

The occurrence of ectopic gestation as the first pregnancy (16.6 per cent.) almost tallies with the number reported by Frank, viz.: twelve out of every eighty cases or 15 per cent.

One Child Sterility (Two Years or More Elapsed Since Full-term Child).

In a series of 186 cases.

	Cases
2 years	9
3 years	6
4 years	4
5 years	4
6 years	5
7 years	1
8 years	1
9 years	2
10 years	2
11 years	1
12 years	4
13 years	2
15 years	3
16 years	3
Total	47

One Child Sterility (Two Years or More Elapsed Since Miscarriage).

	Cases
2 years	3
4 years	2
7 years	2
10 years	3
11 years	2
12 years	1
Total	13

	Cases
Full-term children	47
Miscarriages	13
Total	60 (32.2 per cent.)

	Per cent.
Absolute sterility	16.6
One child	32.2
Total	48.8

History of Infection.

In a series of 186 cases.

	Cases
Syphilis	2
Neisserian infection	3
Pelvic inflammation	3
History of leukorrhea beginning shortly after marriage	12
Total	20 (10.8 per cent.)

Previous Ecoptic Gestation.

In a series of 186 cases.

1. Married 7 years. 1 child 6 years. Neisserian infection 5 years ago. Tubal pregnancy 2 years ago and operated upon in the Woman's Hospital.

2: Age 27. Married 5 years. No pregnancies nor miscarriages. Ectopic gestation 3 years ago. Operated upon in the Woman's Hospital.

3: Age 24. Married 6 years. No children nor miscarriages. Ectopic gestation 13 months ago. Operated upon in the Woman's Hospital.

4: Age 27. Married 6 years. No children nor miscarriages. Ectopic gestation 9 months ago.

Incidence	2.1 per cent.

Other Operations Performed Previous to Ectopic Gestation.

In a series of 186 cases.

	Cases
Dilatation and curettage 1 to 10 years previously	7
Appendectomy (3 months before)	1
Appendectomy (11 months before)	1
Appendectomy (6 years before)	2
Appendectomy (8 years before)	2
Appendectomy (10 years before)	1
Appendectomy (not stated)	1
Total	15

	Cases
Shortening the round ligaments and Appendectomy (2 years)	1
Salpingo-oöphorectomy (9 months)	1
Oöphorectomy (8 years)	1
Oöphorectomy (10 years)	1
Total	19
Incidence	10.2 per cent.

Summary.

In a series of 186 cases.

	Per cent.
Sterility	48.8
History of infection	10.8
Previous ectopic	2.1
Other operations previous to ectopic	10.2
Total	71.9

While it is not possible, of course, to say dogmatically that sterility is evidence of previous infection or inflammation of the tube, still the fact of its existence in such a high percentage in a series of cases, calls for attention to that possibility. The percentage of infection seems low, but it is very difficult to obtain a history of gonorrheal infection and the symptoms are often so mild that the patient is ignorant of the disease. And too, when she does know it, is very reticent about telling the fact.

The presence of adhesions, following any pelvic operation, as Frank has recently stated, ought to be considered as a possible factor in the production of a tubal pregnancy.

In nearly three fourths then of the series was there a history pointing to a possible alteration of the tube of either inflammatory or mechanical origin.

Still another factor should, however, always be borne in mind and that is the malformation or supernumerary Fallopian tubes producing what Huffman has termed the "anomalous embedding area," and which may be a cause of tubal gestation.

Complaint on Entrance.

In a series of 186 cases.

	Cases	Per cent.
Pain without bleeding	58	31.1
Pain, bloody discharge or spotting	47	25.8
Pain and bleeding	74	39.7
Bleeding, no pain	4	
Bleeding, discomfort	1	
	5	2.6
"Tumor"	1	0.53
"Womb drops"	1	0.53
Total	186	

In 96.6 per cent. of the cases pain alone, or pain with spotting or bleeding was the chief complaint on entrance.

Bleeding alone or bleeding associated with pain was present in 67.4 per cent. of the cases on entrance. The blood comes from the endometrium of the uterus when the venous spaces are engorged and there is a partial destruction of the compact layer by the forcible contractions of the tube and uterus in their efforts to terminate the pregnancy. Bleeding may also occur through the uterus from the uterine end of the tube if this is not closed or if opened by the contractions of the tube in its effort to expel the ovum.

Bleeding occurred five times without pain, and it seems probable that the contractions of the tube are not sufficiently forceful to cause severe pain until the supreme effort to rupture the tubal wall, but that the pain complained of previous to rupture is due to bleeding into the peritoneum, or to the presence of blood clots in the pelvis with resulting adhesions to neighboring organs.

Sampson believes that as long as the products of conception are still in the tube that uterine bleeding and pain will continue. While this is probably true, generally speaking, a placental mole may exist in the tube for years without giving rise to such symptoms and the tube may even be the site of a second ectopic while the mole is still in the tube, as in Coe's case.

History of Attack.

In a series of 186 cases.

	Cases	Per cent.
Acute attacks of pain	51	27
Acute attacks of pain accompanied with fainting	34	18
Acute attacks of pain accompanied with dizziness	8	4
Total	93	49

	Cases	Per cent.
Vomiting preceding and during attack	43	23
Nausea preceding and during attack	8	4
Total	51	27
Painful micturition	8	4
Unable to void 2–4 days	4	2.6
Total	12	6.6
Painful defecation	10	5.3
Chills	6	3.2

Acute attacks were present in nearly one-half the cases, and gastrointestinal disturbances in more than one-fourth. In several instances an attack of vomiting was the first symptom of tubal rupture. Webster states that retention of urine is rare in ectopic gestation but it was present in four of these cases and eighteen patients complained of painful micturition or painful defecation. Murray considers the latter as pathognomonic of ectopic gestation but any inflammatory mass with adhesions binding it to the rectum would give similar symptoms.

Location of Pain.

In a series of 100 cases.

	Cases
Absolutely no pain	4
Right lower abdomen	17
Left lower abdomen	10
General abdominal and then right side	5
General abdominal and then left side	4
Lower abdomen	30
Lower abdomen and back	9
Backache only	6
Pain in rectum	3
Pain in epigastrium	4
Slight discomfort	1
Right iliac and kidney	1
Left leg	2
Inner groin left leg	1
Inner groin right leg	1
Left leg to lumbar region	1
Radiating over whole body	1
Total	100
The pain was described as piercing, stabbing, lancinating, shooting, gnawing, cutting, knife-like, terrible, dagger-like or in spasms	35
Severe or sharp	27
Cramp-like, ache, bearing down, labor pain, soreness, or backache	110
Not characterized	14
Total	186

In only 18.8 per cent. of the cases was the pain of the character considered peculiar to ectopic gestation and in the remaining cases it was not to be differentiated from that of any severe pelvic lesion. In seventy-five of the cases the pain was at once, or very shortly after the attack, located over the side affected or the lower abdomen, but in four cases the pain was epigastric, simulating gallstones, and three of the four had severe attacks with persistent pain in this region and slight or no pain in the pelvis.

Onset of Symptoms in Relation to Menstrual Period.

In a series of 100 cases.

Period overdue 2 days	1
Period overdue 3 days	1
Period overdue 4 days	2
Period overdue 5 days	3
Period overdue 7 days	1
Period overdue 8 days	2
Period overdue 9 days	2
Period overdue 10 days	2
Period overdue 12 days	4
Period overdue 14 days	4
Period overdue 17 days	1
Period overdue 21 days	1
Period overdue 4 weeks	1
Period overdue 5 weeks	1
Period overdue 6 weeks	3
Period overdue 8 weeks	4
Period overdue 9 weeks	1
Total	34
No period since previous pregnancy (nursing)	1

Onset of symptoms at the time the menstrual period was due, 30 cases
Onset of symptoms after cessation of normal menstrual period:

	Cases
2 days after cessation	1
4 days after cessation	2
7 days after cessation	1
8 days after cessation	3
9 days after cessation	1
10 days after cessation	2
11 days after cessation	2
12 days after cessation	2
13 days after cessation	1
14 days after cessation	2
15 days after cessation	3
16 days after cessation	1
18 days after cessation	2
20 days after cessation	1
21 days after cessation	4
24 days after cessation	1
25 days after cessation	1
26 days after cessation	1
27 days after cessation	2
28 days after cessation	2
Total	35

	Per cent.
Period overdue in	34
Amenorrhea (nursing)	1
Onset at time of expected period	30
Onset after cessation of normal period	35
Total	100 cases

The onset of symptoms relative to the time of menstruation is very evenly divided in this series, notwithstanding the fact that in the so-called typical case the onset occurs after a period is one or more weeks overdue.

Physical Signs.

In a series of 100 cases.

	Cases
Breasts, tender	4
Breasts, colostrum	14
Abdomen: tenderness, general	5
Abdomen: tenderness in lower abdomen	30
Abdomen: tenderness in lower right quadrant	32
Abdomen: tenderness in left lower quadrant	29
Abdomen: tenderness in region of appendix	4
Pelvis: Vaginal cyanosis	4
Cervix softened	12
Fundus enlarged	32
Mass	42
Definite enlargement of one adnexum	54

Leukocyte Count.

In a series of 100 consecutive cases.

	Cases
5,000 to 10,000	48
10,000 to 15,000	36
15,000 to 20,000	13
20,000 to 25,000	2
25,000 to 30,000	1
Total	100

In 48 per cent. of these cases the leukocyte count was below 10,000 and in 49 per cent. it ranged between 10,000 to 20,000. In ten cases of another series made at a later time, whose count upon entrance was between 16,000 and 30,000 and who had two or more counts made prior to operation, the leukocytosis dropped in thirty-six to forty-eight hours to 8 to 12,000 except one case which was bleeding from a rupture near the horn of the uterus and no walling in and whose count was 23,800 and 21,000.

The high leukocyte count in ectopic gestation is not due to infection but to intraperitoneal bleeding and is a valuable aid to diagnosis of the conditions present and in making a differential diagnosis from suppurative conditions where it remains constantly high without any marked drop to normal or nearly normal.

Hemoglobin.

In the same series of 100 cases.

	Cases
90 to 100	16
80 to 90	26
70 to 80	18
60 to 70	15
50 to 60	11
40 to 50	7
30 to 40	6
24	1
Total	100

In 42 per cent. the hemoglobin was 80 per cent. or above and in 86 per cent. of the cases it was over 50 per cent. The hemoglobin count in ectopic gestation is of doubtful value, as in the acute anemia there is no immediate drop as shown by the findings of Dunn and Wynne and it is until forty-eight to seventy-two hours later that it reaches the lowest point, or not until the ectopic is of considerable duration that the count drops to 50 to 60 per cent.

In the ten cases whose leukocyte count was studied for several days the hemoglobin was found either not to vary in amount or to be increased only 2 or 3 degrees.

Temperature.

In the same series of 100 cases.

	Cases
96 to 98	2
98 to 99	31
99 to 100	43
100 to 101	21
101 to 102 inc.	3
Total	100

In 76 per cent. of the series the temperature was below 100 and in only one case reached 102; but 67 per cent. were 99 or above. It is interesting to note that in every case where the temperature was between 100 and 102 there had been symptoms for some time and considerable old blood and clots found at the time of operation.

Respiration and Pulse.

In the same series of 100 cases.

Respirations:

	Cases
16 to 20	7
20 to 24	81
24 to 28	3
28 to 30	2
30 to 34	2
40 to 50	3
60 to 70	2

In 87 per cent. of the cases the respirations were below 24 and only 5 per cent. were 40 or more. The majority therefore showed a moderate elevation of temperature, pulse and respiration.

Pulse.

	Cases	
70 to 80	4	
80 to 90	39	
90 to 100	18	(61 per cent.)
100 to 110	24	
110 to 120	7	
120 to 130	5	
140 to 150	3	
Total	100	

In 61 per cent. the pulse was below 100 and in only 8 per cent. did it reach 120 or over but 57 per cent. were 90 or above.

Blood Pressure.

Blood pressure was not taken in a sufficient number of cases to make the study of value. It is probable that pulse pressure taken preoperatively as done by Polak to estimate the risk before operation would be a valuable aid when operating during an acute attack as an index of the patient's cardiac strength.

Advanced Pregnancy.

In a series of 309 cases.

In a series of 309 cases. Fetuses were found forty-four times. Eleven were between 5 and 19 cm. Two were intact with placenta in the tube; five were of the tuboabdominal variety being still attached by the cord to the placenta in the tube and the remaining thirty-nine were free in the abdominal cavity, several being macerated, and in pieces.

Combined Pregnancy.—There was one case of combined tubal and intrauterine pregnancy. Rupture of the tube occurred near the uterus at the second month of pregnancy. The patient was operated upon while almost pulseless but made a good recovery and the intra-uterine pregnancy continued to term.

Interstitial pregnancy occurred three times, two were private patients and no history was obtained.

Hospital No. 8624. Patient thirty-eight years. Married twenty-two years. Five children, last three and one-half years ago. Miscarriage eleven years ago and one year ago (curettage). Last period (?) nine weeks before entering the hospital. Irregular bleeding for eight weeks and acute attacks two weeks before entrance. Pain severe and localized in the right hypochrondriac region, fainted, later constant pain in the pelvis. At operation a fetus of 9 mm. was found extruded through the rupture in the left horn of the uterus and the placenta was within the tube. Supravaginal hysterectomy, salpingectomy and appendectomy were performed. A cholecystostomy was done at the same time and 209 gall-stones removed.

Full-term Pregnancy.—There was one case of full-term pregnancy operated upon after death of the fetus.

1. Hospital No. 20942. The patient, aged thirty-two, had been married twelve years and had one child by instrumental delivery eleven years ago. No history of miscarriage or infection. Two years ago she was operated upon in the Woman's Hospital and the appendix was removed and the round ligaments shortened. When she entered the hospital she had had amenorrhea for eleven months with normal increase in the size of the abdomen and all the signs of pregnancy up to three months ago. Since that time the abdomen had decreased and no fetal movement had been felt. On operation the sac was found to be of the intraligamentous variety and contained a well-developed fetus at term. The placenta was removed without difficulty. There were two cases of full-term pregnancy one being within a week and one within twelve days of the normal duration of pregnancy and both were delivered of living children by abdominal operation.

Hospital No. 2132 A and 2895 A. One of the cases was a private patient and no history was obtained. The other gave the following history:

Age twenty-seven, married sixteen months. One miscarriage at the sixth week of pregnancy, occurring four months after marriage. The symptoms of the ectopic gestation began with spotting when the period was two weeks' overdue, associated with vomiting and abdominal pain. The spotting lasted for a month only but the pain and vomiting continued throughout pregnancy. The entire gestation sac was in the abdominal cavity, but there was a distinct decidual reaction of the tubal mucosa as strong evidence of its origin in the tube. As there were several fibroids in the uterus, a complete supravaginal hysterectomy was performed.

Both cases were of the intraligamentous variety and it was possible to remove the placenta in both instances at the time of operation.[1]

Diagnosis.

Stated in 88 cases; not given in 221 cases.

	Cases	
1. Ectopic gestation the first diagnosis in	49	
Ectopic gestation the only diagnosis in	46	
		55.6 per cent.
	Cases	
2. Other conditions or ectopic gestation:		
Appendicitis or ectopic gestation	2	
Salpingitis or ectopic gestation	2	
Threatened abortion or ectopic gestation	1	
Ovarian cyst or ectopic gestation	2	
Total	7	
1 and 2 combined		63.6 per cent.

Mistaken Diagnosis.

	Cases
Salpingitis	10
Hematosalpinx	1
Adnexal disease	4
Ruptured cyst	1
Tuboovarian cyst	2
Inflamed mass	1
Pus tubes	2
Pelvic abscess	2
Pregnancy and inflamed mass	1
Appendicitis	2
Endometritis	1
Retroversion	2
Myomata uteri	3
Total	32

[1] These cases will be reported in detail by Dr. Franklin A. Dorman, to whose care they were admitted.

Unruptured Tube and Diagnosis.

In a series of 309 cases.

.....	29 times
Incidence.....	9.3 per cent.

Ten of the patients were private patients, and no history or diagnosis was given. Of the remaining nineteen the diagnosis was made correctly in 12 cases.

Symptoms.

	Cases
Pain but no bleeding.....	2
Pain and backache.....	1
Pain and backache, bleeding.....	1
Sharp pain and slight bleeding.....	2
Bleeding but no pain.....	2
Bleeding and slight discomfort.....	2
Bleeding and cramps.....	2
Bleeding and sharp attacks of lancinating pain.....	7
Fainted.....	5
Total.....	29

In estimating the number of cases correctly diagnosed as ectopic gestation, one ought of course to know the number of cases diagnosed as such which upon operation proved to be some other condition. The more nearly the case borders upon the typical the more likely will it be that the diagnosis will be correctly made and the farther from this the more difficult or impossible. It will be practically impossible sometimes to differentiate an ectopic gestation from a one-sided pelvic inflammation of the tube, or an intrauterine pregnancy with ovarian cyst, or inflammatory mass, but watching the case for a few days, or an examination under ether, will often clear up the diagnosis. The history of pelvic trouble of not recent origin and sterility, may point the way to the condition. Unusual, one-sided pelvic pain associated with enlargement of the tube, or a mass on that side, whether accompanied or not by bleeding, especially if the pain occurs in attacks with fainting and evidence of peritoneal irritation as shown by vomiting, painful micturition or defecation, warrants the diagnosis of at least a possible ectopic gestation, and the patient should be carefully watched until this is proved or disproved. It is in such cases that a repeated, differential blood count and the character of the temperature curve will be of value.

The Diagnosis of Advanced Ectopic Gestation.

1. The previous history may be that of an ectopic or threatening miscarriage and then normal course of pregnancy.
2. The uterus is only slightly enlarged and empty.
3. The fetus lies apparently just under the skin and is unusually easy to palpate.

Time Elapsed Since the Beginning of the Termination of Ectopic Gestation (Reckoned from the Last Acute Attack) and Operation.

In a series of 86 cases.

	Cases
24 hours (or less)	5
2 days	5
3 days	9
4 days	4
5 days	1
6 days	1
7 days	7
	32 37%

	Cases
8 days	0
9 days	6
11 days	0
12 days	2
13 days	2
14 days	2
15 days	2
16 days	1
20 days	1
21 days	7
23 days	2
24 days	1
25 days	2
26 days	2
27 days	1
28 days	8
5 weeks	6
6 weeks	5
7 weeks	1
8 weeks	1
Total	86

No cases bleeding at the time of operation in a series of 100 cases, 72 per cent., and products of conception were found present in the tube.

Number of Operators.

40 operators performed 309 operations.

	Operations	Per cent.
1 operator performed	63	20
1 operator performed	34	11
2 operators performed	22	(each)
1 operator performed	21	
1 operator performed	20	
1 operator performed	15	
1 operator performed	14	
1 operator performed	10	
2 operators performed	9	(each)
2 operators performed	7	(each)
1 operator performed	5	
5 operators performed	4	(each)
3 operators performed	3	(each)
4 operators performed	2	(each)
14 operators performed	1	(each)
Total	309 cases	

Operations.

In series of 186 cases.

Curettage for bleeding, in ectopic gestation before entrance into the hospital was performed 16 times .....8.6 per cent.

In series of 309 cases.

Curettage was done in the hospital on 2 cases before the diagnosis was made; and as part of the operation 67 times, 21.6 per cent.

Route.

	Cases
Vaginal operation	2
Colpotomy combined with abdominal operation	12
Abdominal operation	295
Total	309

	Cases	Per cent.
Mass walled in 309 cases	82	26.5
Free blood in very large amount and no walling in	39	12.6

Location of Pregnancy.

	Times
4. Right tube pregnant	148
(Twin pregnancy—1 case)	
Left tube pregnant	140
Not stated	21
Total	309 cases

Condition of other Tube.

	Cases
5. Salpingitis	3
Hydrosalpinx	3
Pyosalpinx	2

Result of Gestation.

	Cases
6. Tubal abortion	81
Ruptured Tube	169
Not definitely stated	19
Unruptured	29
Hematocele	8
Full term (child dead)	2
Living child	2
Total	309

Pathological Findings.

1. Uterine cast series 186 cases, 9 times, 4.8 per cent.; the cast was found before entering the hospital in 2 cases; after the operation in 7 cases; the decidua compacta was necrotic in 2 cases.

The history is frequently obtained of flesh-like material passed with the bloody discharge but unfortunately this often escapes notice and no microscopical examination is made. As yet there seems no proof of the constant formation of a decidua uterina in ectopic cases but its absence means nothing as the decidua may have been in an early stage of formation and easily overlooked or it may have been expelled from the uterus previous to the curettage.

2. Curettage, in a series of 67 cases. Decidual reaction present 7 times on 10.4 per cent.
3. Inflammation in the Fallopian tubes. Series of 309 cases:

Chronic inflammation	13 times
Acute inflammation	2 cases
Subacute inflammation	2 cases
	17 times (5.5%)

	Times
1 tube only removed	143
1 tube resected	2
2 tubes	43
1 tube and 1 ovary	109
2 tubes and 1 ovary	6
2 tubes and 2 ovaries	6
Total	309 cases

Other Operations Performed at the Same Time.

	Times		Times
Appendectomy (2 acute)...	66	Myomectomy.....	3
Ventral suspension.....	14	Supravaginal hysterectomy.	7
Plicating round ligaments..	3	Cholecystostomy.....	1
Gilliam operation.....	1	Repair of umbilical hernia..	1
Ovary transplanted.....	1	Plastic.....	4

The treatment has been operative in all the cases, but the time of operation has varied with the practice of the individual operator and the case.

	Cases
Number of patients operated upon the day of admission.....	15
Number of patients operated upon the day after admission..	167
2d and 3d days after	65
3d and 7th day after	41
7 to 14 days after.....	17
15th, 16th and 17th day after (2 cases, 1 at term)	4
Total	309

OPERATIVE TECHNIC.

Laparotomy was performed for all cases except where there was a pelvic hematocele or evidence of infection, with the sac bulging into the vagina. Blood transfusion was employed in three cases operated upon in shock and saline solution given intravenously in several others just previous to or during the operation to tide the patient over that time.

The abdomen and pelvic cavity were freed of blood and clots and the pregnant tube removed.

Effort was made in only two instances to do a partial resection of the affected tube—and other work found necessary was done if the patient's condition warranted the extra time.

Drainage was used in five cases only. Irrigation of the abdominal cavity was not employed.

TIME OF OPERATION.

Perhaps no point in ectopic gestation has given rise to more discussion than the question of operation in an acute attack. In every question so warmly debated and with adherents so fixed in their opinion of the merits on either side there must be something of value to be said for both. Certainly the ideal time of operating

on any patient is when that patient is on the upward trend, but with a break in the arterial circulation, with life blood ebbing out, no one can say if there is going to be any upward trend. If a patient has a secondary hemorrhage following an operation due to the slipping of a ligature, who would hesitate upon recognizing the condition to send that patient back to the operating room? It is true that the conditions favoring clotting are present to a greater degree in tubal pregnancy than in an abdominal hemorrhage. The oozing that probably occurs in all such cases previous to rupture and the frequent occurrence of tubal abortion rather than rupture, favor an exudative inflammation and adhesions, but in many instances there is no walling in by the intestines (12.6 per cent. in this series) and rupture may have occurred near the uterine end of the tube, or the case may be one of interstitial pregnancy and no time for clots or adhesions to form. Schauta's statistics show that of 241 cases of extrauterine pregnancy with spontaneous course, 166 died, a mortality of 68.8 per cent. and again 385 cases treated by operation, electricity or morphine injection 294 recovered and 91 died, a mortality of 23 per cent.

Hunter Robb stated recently that "patients, when they die, usually succumb not from loss of blood but mainly from shock." And again wrote "Why add shock to hemorrhage?" But shock is due to hemorrhage—then why add hemorrhage to hemorrhage?

Simpson has laid down as requisite for operation in such cases the following dictum:

1. Competent operator.
2. Skilled assistants and attendants.
3. Appropriate surroundings.
4. Adequate preparation.

For such difficult work a well-equipped operating room is essential and in no other operation does team-work count for more than in a ruptured ectopic. Light anesthesia, a quick, skilful operator and ready assistants, blood transfusion or saline intravenously to be given just before or as the operator begins and free hypodermic stimulation with camphorated oil, strychnin or adrenalin solution. An internal "hot-water bottle" of a quart and a half saline solution, or, better, soda solution, at 105° F. put into the colon at the completion of the operation, as in Dr. John Clark's technic—the rectal tube having been introduced high up into the rectum before beginning the operation—will aid greatly in the immediate recovery of the patient to combat shock and allay the thirst. It is only

when these cannot be obtained that other measures should be thought of.

If the pelvic examination which is so often the cause of increased bleeding by tearing away adhesions, were deferred in such cases until the patient had been transported to the hospital where such help would be at once available as soon as the diagnosis was established, more patients might be saved by operation and those who survived by the aid alone of restorative measures and must then undergo the operation, would have been saved the risk of another hemorrhage and also the longer convalescence due to increased morbidity following the delay.

DEATHS.

In a series of 309 cases there was three deaths, or .97 per cent.

1. Hospital No. 19117. Age twenty-three. Married six years, one child three years, five miscarriages (induced), the last one and one-half years ago. The history was obtained of an induced "miscarriage" and washing out the uterus four weeks before entering the hospital when the period was twelve days overdue. Colpotomy and laparotomy were performed two days after entrance and a ruptured tube removed but the patient died on the seventh day after operation of peritonitis.

2. Hospital No. 18318. Aged thirty-three. Married seven years. No children. One miscarriage thirteen months ago, curetted.

Acute attack six weeks after a normal period and curettage was done at home. Chills and vomiting followed and on admission the temperature was 101°, pulse 116 and respirations 26. Laparotomy was performed two days later and free blood and clots found and ruptured tube removed. The tubal wall was thickened and showed the exudate of an old inflammation. Death was due to peritonitis.

3. Hospital No. 4992. Aged thirty-two. Married; one child three and one-half years ago. No miscarriage. The history on admission was of pain in the region of the appendix for past five weeks and irregular bleeding beginning seven weeks after normal period. Upon opening the abdomen, six days after admission, a fetus of 12 cm. was found free in the abdominal cavity and the placenta dĕnsely adherent to the tube, omentum and intestine. It was freed with great difficulty and considerable hemorrhage took place, which was, however, controlled, but the patient died the same day.

FOLLOW-UP REPORT.

Eighty patients answered letters of inquiry. Of these, six had had both tubes removed leaving seventy-four on which to base the following report.

Number who had had since operation, either

Child	Miscarriage	Pregnant now	Operation	Cases
0	0	1	0	1
1	0		0	60
2	0		0	6
1	1		0 (each)	2
0	0		Carcinoma of ovary	1
0	1		Ectopic	1
			0	2
11	3	1	0	74

	Per cent.
Pregnant after operation for ectopic	16.2
Operation for second ectopic	1.3
Operation on the second Fallopian tube	No case

CONCLUSIONS.

1. Infection or mechanical alteration due to adhesions of the Fallopian tube predisposes to ectopic gestation.

2. The onset of symptoms or an acute attack occurs equally as often at the time of an expected period, or just after a normal period as it does when a period is overdue.

3. Pain with, or *without* bleeding is present in every case of ectopic gestation unless unruptured.

4. Tearing, lancinating pain is not as common in ectopic gestation as pain of a cramp-like or bearing-down character.

5. Unusual, one-sided pelvic pain when associated with evidences of peritoneal irritation and fainting warrant the diagnosis of ectopic gestation.

6. The treatment should be operative in every case as soon as suitable hospital arrangements can be made, deferring examination until in the hospital if the patient is in a serious condition.

7. The end-results justify leaving the other tube in the abdomen at the time of operation, unless positively diseased.

I wish to thank Dr. George Gray Ward, Jr., for permission to publish this report, and also to thank the Attending Surgeons for their kind help in looking up their cases.

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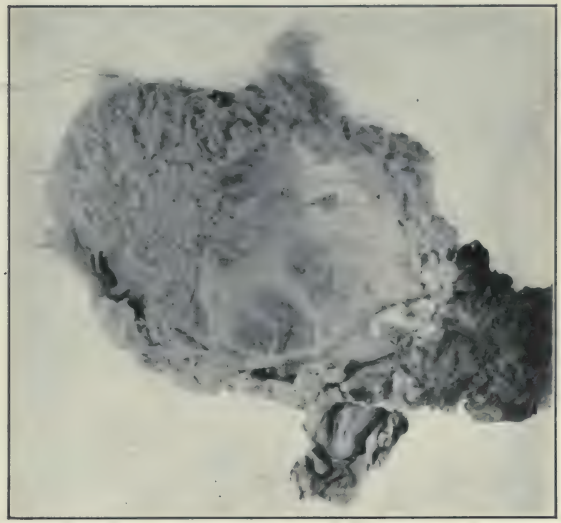

FIG. 1.—Ectopic pregnancy removed from tube intact, showing chorionic villi.

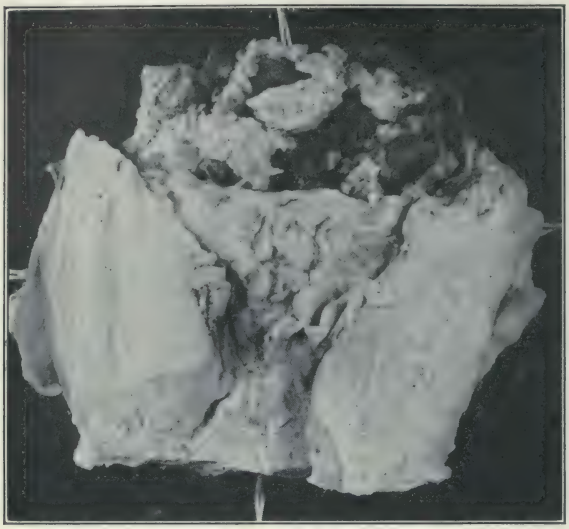

FIG. 2.—Ruptured interstitial pregnancy, specimen shows uterus incised and opened to disclose cavity.

FIG. 3.—Very early ectopic unruptured, showing stunted fetus.

FIG. 4.—Ruptured interstitial pregnancy with visible fetus, uterus incised and cavity exposed.

FIG. 5.—Twin ectopic pregnancy.

POLYPOID ADENOMA OF THE UTERUS.*

BY

L. W. STRONG, M. D.,

Pathologist.

(With nine illustrations.)

ONE of the very frequent forms which tumors of the uterus take, is that of a polypus.

It is not unusual to hear this term used as though it constituted a diagnosis of a condition. It is plain, however, that the word relates merely to external form and tells nothing of the structure and hence nothing of the nature of a tumor. There are a definite number of pathological conditions which may assume this form and these are generally not especially difficult of recognition in the gross specimen, so that it would be more satisfactory to speak of such tumors according to their specific class using the word polypus as a qualifying adjective, thus, "myoma polyposum," etc.

What are perhaps most commonly meant when polypi of the uterus are spoken of are adenomata, either of the cervix or corpus uteri. These are tumors of common occurrence, but they have received rather scanty consideration in text-books and reports, since their importance clinically has been considered to be slight.

In the past five years there have occurred at the Woman's Hospital several cases where such polypoid adenomata have developed into malignancy of a type which appears to have striking individual characteristics.

The general features of uterine adenomata will be considered in this article, with especial reference to the fundal type and their characteristic and peculiar malignant changes.

In introduction it is necessary to consider all possible polypoid tumors in order to point out the distinctions which enable one to make a diagnosis in the gross specimen as well as to indicate the differences and the relations which exist between the different forms.

Firstly, as to polypoid form, it should be noted that in all classes of tumors this is but a mechanical and secondary effect of the special region in which a tumor is produced and that it has no pathological

*From the Pathological Laboratory of the Woman's Hospital, New York. Published in the *American Journal of Obstetrics*, April, 1919.

significance in itself. It frequently does have a clinical significance which may be important, such as hemorrhage and necrosis, both due to interruptions in the blood supply. Also it may be less malignant or more easily removed surgically on account of the polypoid form. But these clinical differences have also a mechanical origin and do not affect the nature of the tumor, which is the most important thing for the clinician to know.

The simplest group of polypoid tumors for us to exclude from the adenomata are the myomata. These will generally be recognized from their firmness, the uniformity of the surface on section, and their almost universal occurrence in the fundus. They may migrate to the cervix but this is unusual. They are in general much larger than simple polypoid adenomata.

Polypoid myomata owe their form to a simple mechanical cause, the contraction of the muscular walls of the uterus. The elongated form is due to the resistance of the pedicle and the shape of the uterine canal. The direction of least resistance is toward the os, which explains the growth in the long axis and the occasional "birth" of such a tumor.

Polypoid myomata are particularly apt to produce hemorrhage and to undergo necrosis. The hemorrhage may be metropathic or local, due to circulatory disturbances in the structure, but in other regards the polypoid form gives no basis for considering the tumor anything more than a myoma and hence we should thus designate them, "myomata polyposa."

Simple polypoid hyperplasia of the uterine mucosa should next be mentioned, since both practically and theoretically it approaches the adenoma and is hard to differentiate from it.

Schroeder states that there is no local polypoid hyperplasia of the mucosa, that pedunculated mucous polypi are always true tumors of autonomous character. While in the strictest sense of pedunculated tumors with a narrow neck and base this may be true, there nevertheless occur simple hyperplasias which are practically polypi. These are broader based than the adenomata. Their histological structure may be described as an exaggeration of the normal, due to mechanical, circulatory or inflammatory stimulation. They are smooth and regular in surface outline and are pale, soft and edematous. They occur in the body and fundus and are frequently associated with myomata. Microscopically, the glands are regular in outline without irregular mitoses or metaplasia of the cells.

The glands may be wider than normal and the stroma more abundant. Both exhibit the normal menstrual cyclic changes.

From this simple overgrowth, the condition increases to a form known as glandular hyperplasia ("glandular endometritis") where the glands are relatively more abundant than the stroma, where they are wider and more irregular in outline. The boundary of the basalis with the muscularis is sharp and there is no irregular penetration of the glands into the muscularis as occurs in adenomas and adenomyometritis. The end of the physiological proliferative stage of the uterine mucosa may be mistaken for pathological hyperplasia.

The stimulus producing diffuse hyperplasia is probably ovarian in origin but these local polypoid hyperplasias generally have an obvious mechanical cause, as the presence of a myoma.

Finally carcinomata and sarcomata may occur in polypoid form. The carcinoma is easily recognizable from its extreme irregularity and from the fact that the base shows destruction of the myometrium. Endometrial sarcomata are very much rarer. They are large, round, very soft and fleshy tumors, of uniform appearance on section and invasive in the myometrium.

A polypoid myoma may be sarcomatous but will be recognized as a myoma.

These are all the polypoid tumors which have to be distinguished from adenomata.

The adenomata themselves occur either in the body or the cervix uteri, most frequently in the cervix and in the tube corners. They are somewhat more irregular in outline, firmer than the hyperplastic polypi and not uniform on section, but show a rather honeycombed structure. Cervical adenomata will have no further description in this article; what follows will refer to the fundal type alone.

Adenomata start as areas in the mucosa involving the basal layer with glands lying in more or less definite groups.

The stroma is thicker and larger celled, with conspicuous vessels. The glands are chiefly of the basal type; that is simple tubules which may be dilated and may be irregular in outline. These do not follow the typical menstrual cyclic changes, though they may show premenstrual outlines without functional activity in form of secretion. These areas are not cast off during menstruation according to Schroeder. They project more and more into the functional layers of the mucosa and thus ultimately form polypi. They show rudimentary division into a basal and an outer functional layer.

The reason that uterine adenomata are polypoid is a physical one, namely, that they are surface tumors. Adenomata are non-invasive proliferations of simple glands, and the increase in bulk

produced by the proliferation, being nondestructive of other tissue, tends to grow in the direction of least resistance. So on a surface, the proliferation is outward. Just as the clinically benign glandular tumors of other mucous membranes form polypi, so does the mucous membrane of the uterus. Adenomata of the intestine, of the respiratory tract, of the bladder and all other mucous surfaces are polypoid. It is only when a glandular tumor is enclosed in a solid organ as kidney, ovary or liver, that a solid adenoma is formed. If a glandular tumor has not this outgrowing type but is invasive it is to be classed as carcinoma. It has sometimes been stated that there were no adenomata of the uterus; that glandular tumors were in reality carcinomata, though sometimes called adenoma destruens. The fact is that these simple glandular polypi are true adenomata and should be so designated while the invasive glandular tumors should always be termed carcinoma with the qualifying term glandular. The term adenoma destruens when used for carcinoma is inexact and confusing.

Microscopically, the adenoma has in general all the characteristics that the hyperplasia has not; that is, the glands are irregular in size and outline, their cells show irregularities of arrangement and form, the relationships between gland and stroma are widely disturbed.

The basal layer has the adenomatous changes as marked as the rest of the mucosa instead of the relatively simple glands of the normal basalis. There is no difficulty in recognizing an outspoken adenoma but the changes which separate it from simple hyperplasia are all relative and not absolute.

In the same way the adenomatous changes merge into those of a carcinoma. By that it is not meant that it is common to find a transition between these two tumors, but rather that the border line between carcinoma and adenoma is vague.

The term "adenoma" requires some explanation since all writers do not use it in the same sense.

Ewing says in regard to adenoma, that it is rarely a distinct morphological entity but is rather to be regarded as a series of structures which tissues assume in response to various forms of irritations. Most authors distinguish sharply between true adenoma and adenomatoid hyperplasia, but this cannot be done on morphological data alone. According to this view, it is not always possible to say whether a polypus is hyperplastic or neoplastic, and this appears to be the case in those reported here.

We are in the habit of regarding a tumor as if it were a disease itself, while in fact it is only the reaction of the tissues to the stimulus

of a disease. This reaction may be the same for both a known stimulus or an unknown one as in the case of cancer. This view makes it clear why there is no histological distinction between hyperplasia and adenoma in its inception.

A typical simple adenoma polyposum of the body of the uterus appears in Case No. 14285 of the Woman's Hospital Pathological Records. The uterus measures 7 × 4 × 2 cm. Myometrium 1 to 5 cm. thick, is fibrous; mucosa atrophic. From the fundus projects a mucous polyp 4 cm. in length and 5 cm. wide. It is attached by a narrow pedicle to the myometrium.

Microscopic examination shows fundal glands of the proliferative type which are dilated and tortuous. Side by side, lie lumina, both very small and very large, probably representing cross-sections of one tortuous gland cut in various loops, thus simulating glands of different caliber. The basal layer is very sharply demarked from the myometrium and there is no penetration of the glands, but these are dilated and tortuous to the very base. There is a distinction between an outer compact and an inner spongy layer. The glands show no irregularities of mitosis or cell layers. The stroma is very cellular, the cells are large and round, not stellate nor fibroblastic. There are definite bundles of connective tissue and some few smooth muscle fibers scattered through the stroma. The blood-vessels are inconspicuous. This polyp differs from simple hyperplasia in the irregularities and cystic dilatations of the glands, in the more cellular stroma of simpler typed cells.

Asecond case, No. 14886, differs from this merely in showing glands of marked premenstrual outline which nevertheless do not show the evidences of secretory activity exhibited in the rest of the mucosa of the same uterus. The glands show serous contents while the rest of the mucosa shows mucinous contents. The polyp is markedly inflamed.

Case No. 16226 shows the next stage in complexity, for here the basal glands instead of being sharply demarked from the endometrium show some penetration, and at the same time a heaping up of the cells into several irregular layers with irregular mitosis. This suggests beginning carcinoma.

Next comes Case No. 12730 which is an adenoma polyposum with very irregular glands and irregular layering and mitoses. In the center of the polypus occurs a group of glands which are definitely carcinomatous. This case is cited as an instance of an adenoma polyposum originally benign in which a carcinoma develops, not a carcinoma assuming polypoid form.

We now come to three cases of known clinical malignancy which in their structure still enable us to determine that they were originally adenomata polyposa. It is not possible to prove that they were originally entirely benign and that the malignancy was a secondary change although at least one of the three still preserves a histological appearance which might be regarded as inflammatory. Still whether the malignancy is secondary or coincident does not alter

the fact that the basal condition is that of adenoma polyposum and the malignant changes are of such an indeterminate type that one cannot speak of them as either frankly carcinoma or sarcoma. That they are malignant, however, is absolutely demonstrated by their rapid recurrence after removal and their rapid increase in size. There has already been a fatal issue in one of the three.

No. 15398, uterus with both adnexa. Uterus is globular, measures 11 cm. in diameter. The uterine cavity is greatly dilated by a large polypoid growth measuring 10 × 6 cm. The polyp is composed of several lobes and arises from the tube corner and fundus. The tip is greenish and hemorrhagic (Fig. 1). Sections show a typical adenoma polyposum in some parts of which the glands become extremely irregular. The stroma is for the most part very cellular and shows diffuse necrosis.

In one area where the glands are extremely numerous and irregular, there is a wedge-shaped crowding of the nuclei of many cells which have lost connection with the glands and form a solid carcinoma. In other areas the carcinoma cells penetrate the entire tissue so thickly that the relations are obscured. Here the tissue is necrotic, many cells have fallen out and the frame work of stroma remains. In other areas there is a well-preserved surface layer of epithelium below which are crowded large round cells apparently stromal (Figs. 2, 3).

This case is an adenoma polyposum in which a carcinoma solidum has developed. The penetration of the tumor cells is so diffuse in the stroma that it might be regarded as a sarcoma.

This case corresponds to many in the literature described as carcinosarcomata but which are in reality diffuse carcinomata.

There was a rapid recurrence of this tumor after the original complete hysterectomy. In six months just inside the introitus is felt a hard nonulcerating mass.

The second case, No. 12461, consists of the uterine body with both adnexa, the lower part of cervix is missing. Uterus measures 8 × 6 × 5 cm. On opening the uterus the entire mucosa is found replaced by a polypoid villous growth. The myometrium is slightly invaded by this mass especially near the fundus. The posterior wall of the uterine myometrium shows a lacerated opening, the edges of which are composed of tumor material. Long polypi project into the uterine cavity showing necrosis and hemorrhage (Fig. 4).

A number of sections taken from the uterine mucosa show the adenomatoid nature of the condition. There are cystic and normal glands. The stroma is rather fibrous and shows marked hyaline degeneration of the vessels. The stroma of these polypi suggests sarcoma. Received separately a mass sloughed off from the main tumor. This shows only traces of glands, the rest being a solid mass of cells with great irregularity of both cells and nuclei. Many giant cells with central and peripheral nuclei.

This tumor recurred in the stump in four months and grew rapidly (Figs. 5 and 6). It was checked by radium for a time but not lessened.

The diagnosis in this case is given as sarcoma on account of the many giant cells with irregular mitoses in the stroma. It is plainly not a carcinoma and yet the glands show marked proliferation and irregularity of cell layering and mitoses. But there is no invasion of the glands nor escape of cells from the glands. This case corresponds to those described in the literature as carcinosarcomata, but which Meyer regards as sarcomatous polyps with proliferation of the surface glands.

The next case is No. 11997, of which curetings alone were received, consisting of yellowish pieces of tissue. These show microscopically, polypoid masses with rounded surfaces covered by a columnar epithelium. There is an intensely cellular stroma containing relatively few glands, both elements undergoing very active proliferation. The glands show an enormous multiplication of the epithelial cells with two to three layers. The stroma is composed of spindle, round and giant cells with many nuclei, all showing optical unrest. In this instance we do not have the uterus with the gross tumor, but the histological picture is identical with those just described, namely, a fibroadenomatous polyp (Fig. 7). In this instance, the stroma apparently becomes sarcomatous, the scanty glands, however, showing the same irregular proliferation as in the other cases.

Clinically, the case was malignant, the patient dying from a recurrence within eighteen months.

It cannot be considered a carcinoma because the stroma changes were the more extreme, but certainly both stromal and glandular proliferation were present in a high degree (Figs. 8 and 9).

I wish to refer to one other case which occurred in the clinic of Professor Schottländer in Vienna. The sections and descriptions of this were loaned me by Dr. Schwarz. This also gives the picture of an adenomatous polyp, identical in appearance with the last case. The diagnosis is "Polyp of the Corpus with glandular carcinoma, with extensive infiltration of the interstitial tissue, possibly transformed into sarcoma.

From these cases the conclusion may be drawn that this class of tumors should be considered fibroadenomata polyposa and that they undergo malignant changes which may manifest themselves either in the glandular or in the stromatogenous elements. Characteristically, both show some change and in some instances it is impossible to say which is the more outspoken. If metastases could be examined, it would throw light on the matter. These characteristics have been found only in the fundal, tube corner adenomata and they appear so individual to these tumors that they might properly be called adenofibroma malignum, without assigning them definitely as either sarcomata or carcinomata.

The polypoid adenoma of the uterus is not a simple glandular tumor, but it belongs to the group of fibroepithelial growths of which the breast furnishes the type. The stroma is as essentially a part of the neoplasm as are the glands. In some polypi the stroma alone appears without any glands, though of course, there is an epithelial surface.

There occur in the literature, many cases described as carcinosarcoma of the uterus, some of which seem to correspond to these malignant polypoid adenomata. Meyer in Veit's Handbuch, defines carcinosarcoma as a double tumor of two independently arising components, a mixture and a side by side growth of a carcinoma and a sarcoma.

Our tumors cannot come under this designation since they are not two independent tumors plainly carcinomatous and sarcomatous. In fact, a single representative section of one of them, Case No. 11997, was sent to Professor Meyer who gave his opinion that it was not carcinoma but inflammatory.

Professor Meyer did not have the opportunity of examining either the gross specimen nor all the sections. The patient subsequently died of a metastasis.

Ewing divides the reported carcinosarcomata of the uterus into several classes.

The first seems to correspond to Meyer's conception.

The second includes cases where two tumors arise separately but later one invades the other. Thirdly, at a point where a submucous or mural sarcoma meets the glandular layer a carcinoma results separately. Four, the glands in a sarcomatous polyp or in an inflammatory polyp may become carcinomatous. Five spurious cases, really carcinomata but with a diffuse growth simulating sarcoma.

When trying to assign the cases here reported to any one of these groupings, two outstanding facts become apparent, first that they are not frank sarcomata and secondly, that they are simple polypoid adenomata in their origin. Without reference to the fact that mixed and combination tumors of the uterus occur, there yet appears to be another form which is not uncommon. These are fibroadenomata originally simple but which have undergone malignant change characteristic in both glands and stroma. They are not carcinosarcomata, for the glands at least do not justify that diagnosis, nor is the stroma frankly sarcomatous.

It is probable that the case described by Ballin belongs to this category and he makes the same assumption that we do in regard

to the origin in a glandular polyp and the malignant degeneration of glands and stroma.

The peculiar menstrual cycle of the uterus may have a bearing on the production of adenomata by acting as a chronic irritant.

Not only is there intense hyperemia at the time of the premenstrum but also there is an outpouring of leukocytes and necrosis of tissue. Round and plasma cells give evidence of a chronic inflammatory reaction.

Schroeder holds that the tips of these adenomata are not desquamated together with the rest of the mucosa during menstruation, which seems plausible in view of the fact that they do not share in the secretory stage. This would certainly be difficult to establish without sections of polypi at the time of menstruation, but assuming the correctness of the statement we have a reason for their growth, in that they are not desquamated at every menstrual period. The frequency of their occurrence at the tube corners is to be attributed to the irritation of tubal secretions.

In general a relationship between the number, form and size of uterine glands and hemorrhage does not exist, so that a polypus *per se* is not necessarily a cause of hemorrhage. At times one may see in the gross specimen a definite bleeding point in a polypoid adenoma where a vessel has ruptured into a cystic gland. These undoubtedly are local sources of hemorrhage.

There remains to mention the diffuse adenoma polyposum fungosum where the whole endometrium is converted into a shaggy coat. An instance of this is No. 8848 already reported by Dr. Grad. This occurred in a girl of eighteen years, who was first curetted of a very large amount of tissue showing intense hyperplasia of very simple glands, the cells of which were perfectly regular and gave no suggestion of malignancy. The condition rapidly recurred and a complete hysterectomy was done. The sections again showed no evidence of malignancy although the hyperplasia was extreme.

Finally it must be mentioned that some adenomatous polyps of histologically benign appearance recur repeatedly after removal.

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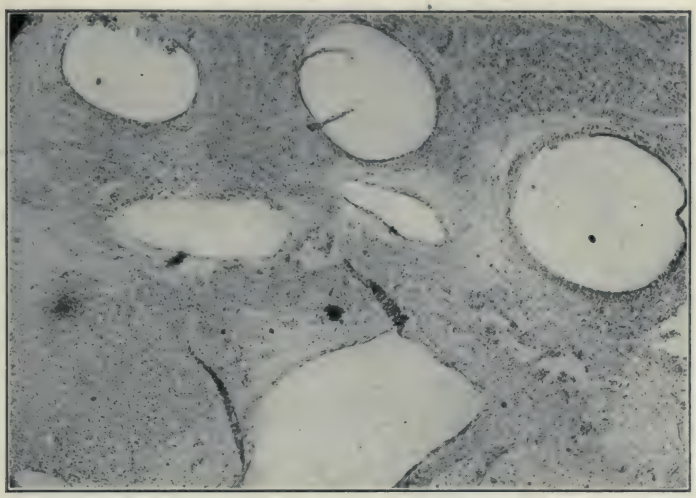

FIG. 1.—Adenoma polyposum. Simple dilated glands and simple fibroblastic stroma.

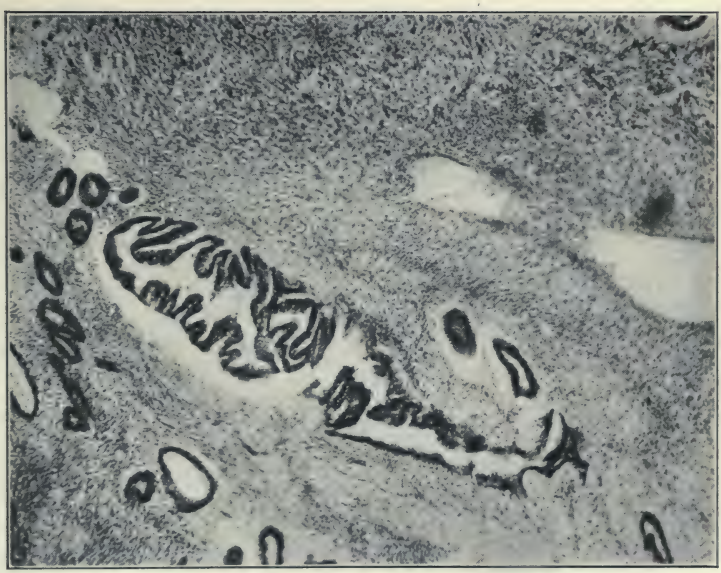

FIG. 2.—Glands suggesting carcinoma. In other sections carcinoma becomes diffuse.

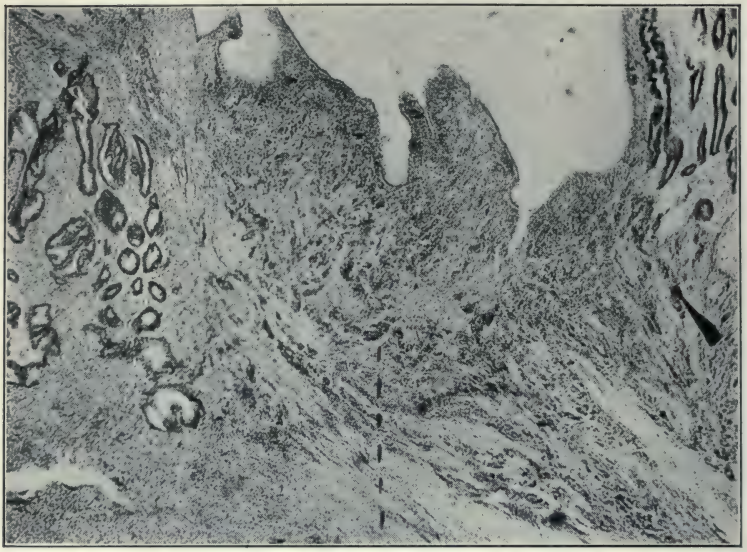

FIG. 3.—Diffuse carcinoma. Low power. Carcinoma diffuse in adenoma polyposum.

FIG. 4.—Showing adenomatous polypoid structure which gives no appearance of malignancy.

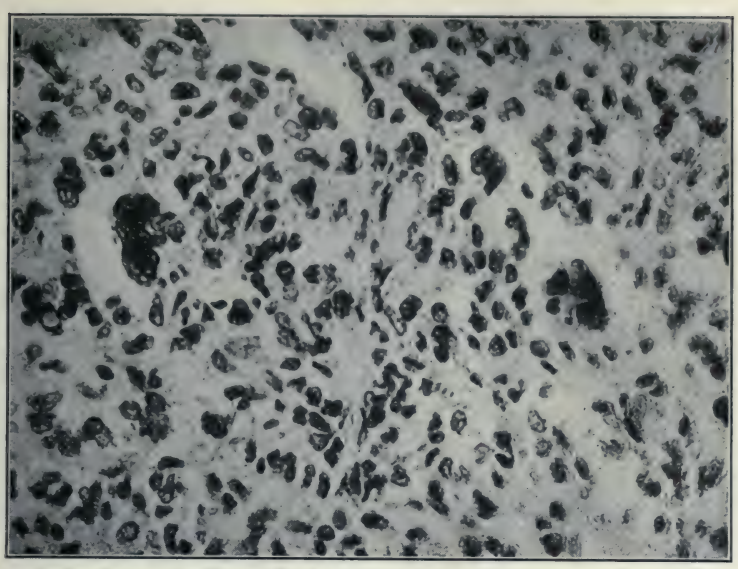

FIG. 5.—Mitotic nuclei and giant nuclei in stroma, suggesting sarcoma.

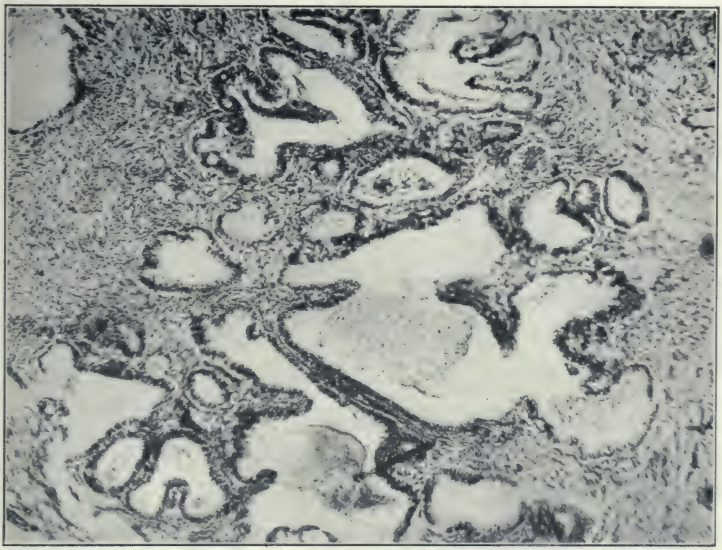

FIG. 6.—Adenomatous glands, very hyperplastic.

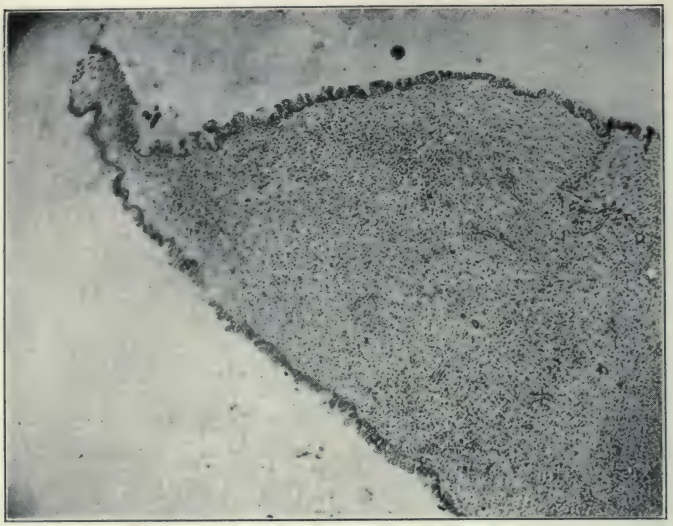

FIG. 7.—Adenoma polyposum. Proliferation of surface epithelium but no evidence of malignancy in glands or stroma.

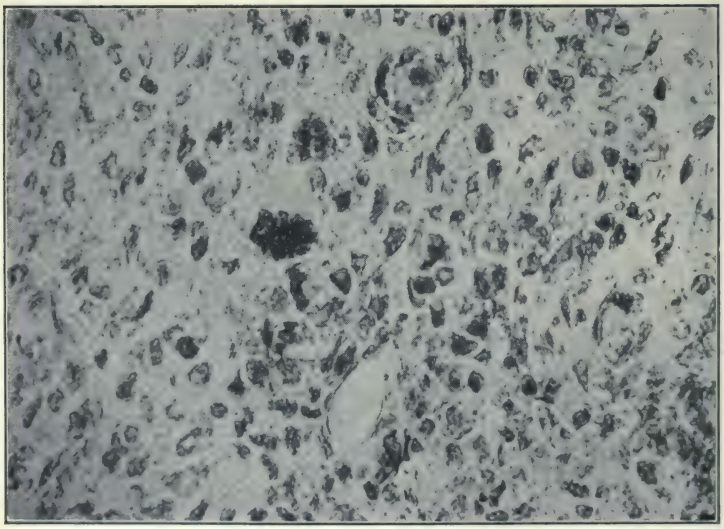

FIG. 8.—Mitotic and giant nuclei in stroma (sarcoma).

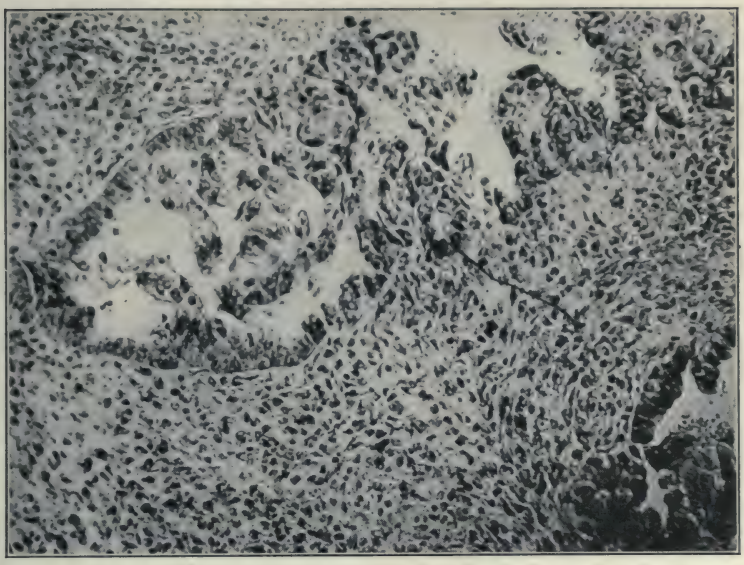

FIG. 9.—Hyperplasia of both glands and stroma (carcinoma ?).

THE PROBLEM OF THE CYSTOCELE.*

BY

GEORGE GRAY WARD, JR., M. D., F. A. C. S.,

Chief Surgeon

(With eleven illustrations.)

I WOULD feel some hesitancy in bringing to your attention a subject which has been so thoroughly discussed and written upon for the past one hundred years, that you may well ask "What more is there to be said on cystocele," if it were not that your distinguished ex-President, Dr. Barton Cooke Hirst, in the course of his Presidential Address delivered before you just a year ago, stated that in his opinion, one of the three subjects on which you all craved more enlightenment was the best operative treatment of cystocele in young child-bearing women.

I must preface my remarks by saying that I have no new operation to advocate, and my only excuse for adding to the voluminous literature of the subject is, that I agree with Dr. Hirst as to the need of the clarification of the hazy atmosphere enveloping this problem, not only for our own sakes, but especially for the benefit of our undergraduate students, who must of necessity be hopelessly confused by the complexity of the principles involved and the numerous angles of view as to their relative importance, which are presented for their edification in our text-books and the literature.

The subject of cystocele has recently received much attention, as shown by the numerous contributions in medical journals. Usually the writer is anxious to advocate some particular operative technic which he has devised and which frequently takes cognizance of some one principle involved in the problem with a disregard of other factors which are equally essential, or more important. In some instances the technic exploited is so involved and complicated that the length of time necessary for its proper execution is out of all proportion to any advantage that might be gained. It is thus detri-

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mental to the best interests of the patient, owing to the fact that cystocele is a condition that is almost always associated with other lesions requiring operative procedures, and the necessarily prolonged etherization is not warranted.

The history of cystocele has been recently reviewed by Rawls and brought up to date, and I would refer any one interested in this phase of the subject to his excellent article, which contains over one hundred references(1).

To discuss cystocele intelligently we must first classify the cases according to whether child-bearing is, or is not a factor to be considered, and whether the cystocele is accompanied by prolapse of the uterus. The problem to be considered in the young child-bearing woman is entirely different from the case of the woman whose uterus is not capable of reproduction or is past that period. The methods at our disposal for the repair of cystocele where child-bearing is not a factor are more certain of a permanent cure in their final results than are the available methods where the parts have to bear the strain of subsequent labors. Therefore, the opinions of gynecologists are more at variance to-day on the treatment of cystocele in the child-bearing woman, and the greater part of my remarks will be confined to this phase of the subject.

I am aware that some authorities make the statement that cystocele is always accompanied with prolapse of the uterus in some degree. While I agree that perhaps the majority of cases may fall into this category, still I see many cases with large cystocele where the degree of prolapsus uteri is negligible, although I recognize the fact that the cystocele is an early phase of the prolapse which follows and is an essential factor in that condition. According to my view point, where prolapse exists the technic to be employed *must* correct that condition, or whatever operative procedure we employ on the cystocele itself will prove unsatisfactory.

The bladder may be said to be held in place by anatomical structures working on opposite principles, the *supporting apparatus* as the utero-pubic fascial plane and the anterior vaginal wall with the accessory aid of the posterior segment of the pelvic floor, and the *suspending apparatus*, such as the ligaments and connective tissue which suspend or hold the organ by attachments to the uterus and the pelvic structures. Both muscular and fascial apparatus play reciprocal rôles in the maintenance of the bladder *in situ*, and the injury which causes these supports to fail in their function may be located in different parts or in several parts of these structures, so that whatever operative procedures we may employ for the

correction of the injury should be applicable to all the parts that have been damaged. The mistake is often made of employing one general operation for all classes of cystocele instead of individualizing and adapting the operation to the particular case.

Reynolds has pointed out that it is important for us to bear in mind that the anterior vaginal wall has two fixed points of attachment—the attachment to the cervix and base of the broad ligaments and to the posterior surface of the pubes. The pubic attachment of the vagina is very firm and practically never yields. Unfortunately

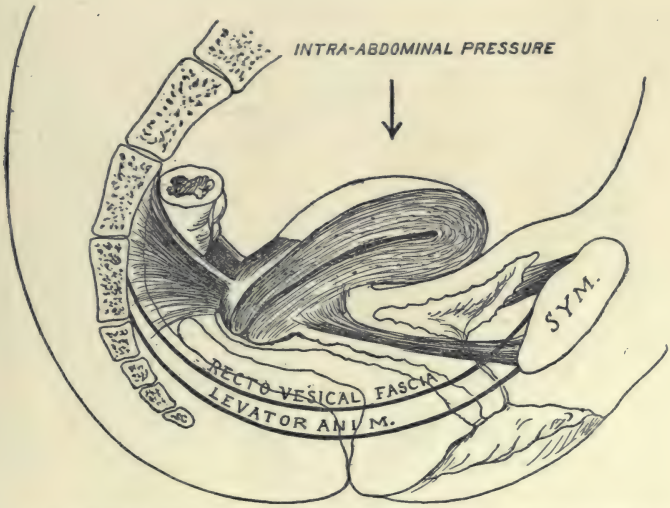

FIG. 1.—The relation of the uterus and bladder in the normal position. The anteroposterior fascial sling formed by the uterosacral ligaments posteriorly, and the uteropubic fascial plane anteriorly. Note the deflection of the intra-abdominal pressure by the posterior surface of the uterus and the protection of the bladder from this pressure. (*After Crossen.*)

the same is not true of the upper point. We know that the chief supports of the uterus, which are the base of the broad ligaments (the so-called cardinal ligaments) and the uterosacral ligaments, stretch and thus fail to support the organ, and as an inevitable consequence a concomitant prolapse of the bladder occurs.

There is another class of cases where failure of the uterine supports does not occur as the primary lesion, but the attachment of the anterior vaginal wall to the upper portion of the cervix is torn away during labor and with it the bladder attachment to the same structure, thus destroying the normal depth of the invagination of the cervix in the anterior fornix. This creates a "weak

spot" in the median line in front of the cervix and favors a gradual prolapse or hernia of the bladder. This injury may be readily demonstrated with a sound in the bladder in comparison with an uninjured case. Where the bladder and vagina have been torn away from the front of the cervix, the tip of the sound will be felt almost at the external os, showing the descent of the bladder and the loss of the normal invagination of the cervix with nearly an obliteration of the anterior vaginal fornix, while in uninjured cases, the tip of the sound will be several centimeters above the os.

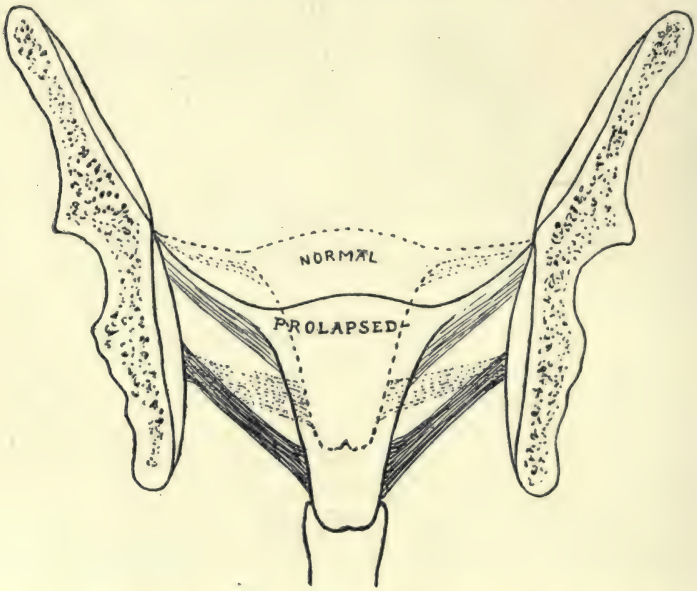

FIG. 2.—The dotted lines show the uterus and cardinal ligaments in normal relation. The shaded lines the elongated overstretched cardinal ligaments when the uterus is prolapsed.

We are all familiar with cases of prolapse where the cervix is at the vulva, while the body of the uterus is held in normal position. The protrusion of the cervix is caused by the marked elongation of that organ due to traction of the anterior vaginal wall which pulls on the cervix at its attachment *below* the base of the broad ligaments as a result of this common injury.

The prolonged dragging on the base of the bladder and the vaginal wall caused by the prolapse, results in an actual demonstrable increase in the anteroposterior measurements of these parts, so that in a cystocele of any moment we have both a lengthened

bladder base and anterior vaginal wall, due to stretching. Careful measurements taken on normal patients and on a plaster cast made from the cadaver of a parous woman with uninjured structures, show that the average normal length of the anterior vaginal wall from its junction with the cervix to the external meatus is 6 to 7 cm., while in repeated measurements which I have made on well-marked cases of cystocele, show an average of 10 to 11 cm. I believe that this anteroposterior increase in the length of the vaginal wall and bladder base is one of the most important factors to be considered in the correction of cystocele.

FIG. 3.—The normal relation between the anterior vaginal wall, the cervix, and the bladder. Note the invagination of the cervix.

As the formation of a cystocele progresses, the fibers forming the uteropubic fascia, or so-called "bladder pillars," extending from the base of the broad ligaments to the pubes, become attenuated and separated in the midline and the continued stretching results in a thinning of the vaginal wall in the center, and an increase in the transverse dimension of the vagina and bladder base. This lateral increase, in my opinion, is of less importance than the antero-posterior increase, although attention is usually focused upon it,

and many operations in vogue to-day rely mainly on the correction of this lateral stretching for the cure of the cystocele.

When cystocele is associated with prolapse of the uterus of any marked degree, it, of course, implies a condition of uterine retrodisplacement as well, on account of its descent in the line of the curve of Carus, with a resulting failure of the deflection of intra-abdominal pressure which is normally accomplished by the anteverted position of the uterus. That cystocele and prolapse are practically always associated with an impaired pelvic floor function

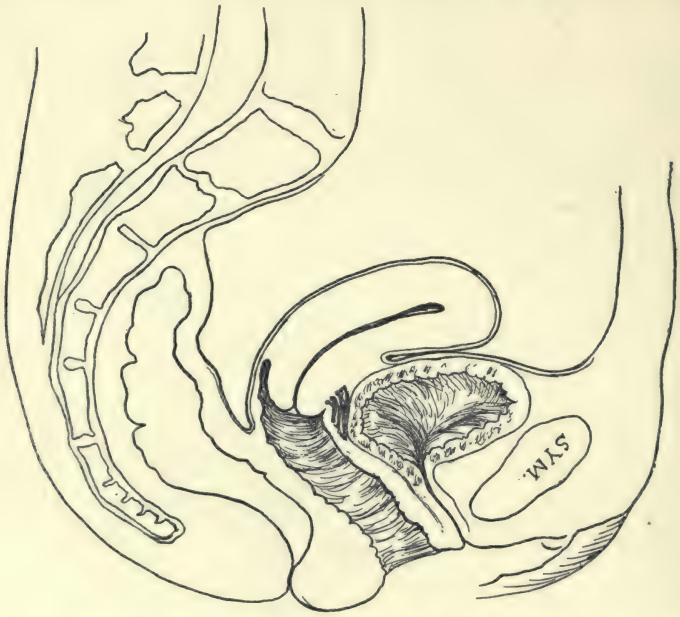

FIG. 4.—The tearing away of the vaginal wall and bladder at its point of attachment to the cervix, showing the development of the "weak spot" as a result of injury during parturition.

due to relaxation or injury resulting from childbirth is, of course, recognized by all.

We may summarize these injuries to the anatomical structures which play a part in the etiology of cystocele as follows:

1. Detachment of the anterior vagina and the bladder from its normal relation to the anterior cervical wall with a loss of the normal invagination of the cervix and a resulting "weak spot" at this site.

2. Attenuation and separation of the fibers of the uteropubic fascia, the result of stretching.

3. Displacement downward of the bladder.

4. Anteroposterior increase in the length of vaginal wall and bladder base.

5. Transverse increase in width of the vaginal wall and bladder base.

6. Thinning of the vaginal wall in the midline.

and as complications—

7. Prolapse of the cervix with the uterine body *in situ*.

8. Prolapse of the uterus with associated retrodisplacement.

Two mechanical principles are involved in the correction of these

FIG. 5.—Widening of the "weak spot" with consequent loss of invagination of the cervix and descent of the bladder with increased length of vaginal wall and bladder base due to stretching, thus resulting in the formation of a cystocele.

cases, namely—suspension and support. Interposition is, of course, a form of support below the bladder and is only applicable to the nonchild-bearing cases.

I. *Nonchild-bearing Women.*—In nonchild-bearing women we may employ any principles in the repair which will produce the most positive fixation of the organs irrespective of their normal relations. The nonchild-bearing cases which are not accompanied with prolapse beyond the second degree, are readily and satisfactorily corrected by the Watkins' method of interposition provided the uterus is in a normal condition. Unfortunately, however, in a

large number of these cases the uterus is not in a condition which makes it safe or wise to retain it. If the uterus is diseased, or unsuitable for the purpose on account of its size, in my opinion this operation is not advisable. In such cases Simpson's suggestion of partial removal of the uterus by resection of the mid portion of the body and uniting the lateral walls by suture in order to remove the diseased area or to reduce its size, and then interposing the reconstructed organ under the bladder is a satisfactory solution of the problem. In the nonchild-bearing cases accompanied with marked or complete prolapse, I have had most satisfaction with the

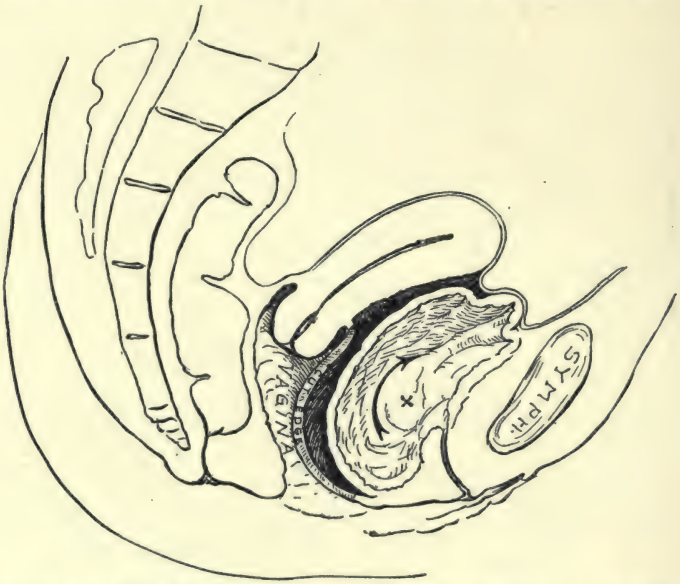

FIG. 6.—The principle employed to correct the cystocele. *First step:* The mobilization of the bladder by separating it from the vagina and uterus in order that it may be replaced higher up by rotation about its transverse axis.

Mayo operation, in which a vaginal hysterectomy is done, with suturing together of the broad and round ligaments, and interposing them under the bladder, the top of the ligaments being firmly united to the sides of the pubic arch close under the urethra, and the vaginal wall sutured to the united ligaments. This operation if properly done, I believe gives us a permanent cure of the condition.

I have been interested in noting that Dr. Bissell performed this operation at the Woman's Hospital on February 15, 1912, as shown by the records. He did this without any knowledge of the Mayo's work in this direction, but unfortunately did not publish it. Their description of the operation was published in March, 1915.

Goffe's operation for the cure of this type of case, of doing a vaginal hysterectomy, suturing the broad and round ligaments together, and then fastening the bladder by suture to the *anterior* surface of the united ligaments, I have had considerable experience with, and it is generally satisfactory, but it is more difficult of execution in my opinion than the Mayo technic and in no way so positive of a permanent cure. These two operations depend upon entirely different principles for holding the bladder in place. Goffe's

FIG. 7.—The principle employed to correct the cystocele. *Second step:* The bladder is replaced and straightened by upward traction of the vaginal wall, thus disposing of its excess length. The bladder base is attached to the anterior surface of the uterus by a suture. The vaginal wall is attached by two sutures to the uterus at a point *above* the internal os, thus angulating the vagina and disposing of its excess length, anteverting the uterus, restoring the invagination of the cervix, and repairing the injury which caused the "weak spot."

method depends on the principle of suspension, while the Mayo operation is an interposition operation, and therefore relies on the principle of support from below.

A successful result in either the Watkins or the Mayo interposition operation is largely dependent on the proper securing of the interposed structures to the subpubic arch. A point in the technic which I think is important in order to insure this, is to use kangaroo tendon for the sutures attaching the uterus or the top of the broad

ligaments to the pubic arch on each side of the urethra. I use a short stout curved needle and pass it under the guidance of my finger against the pubic ramus until the point strikes the bone, and obtains a good bite of the periosteum. In the Mayo operation, it is also important to be sure and include the uterosacral ligaments in the forceps that grasp the base of the broad ligaments before cutting away the uterus, and to make certain that they are embodied in the suturing together of these parts.

II. *Child-bearing Women.*—In child-bearing women it is essential that we employ principles in the repair of the injury that at the same time restore the parts as nearly as possible to their normal relations, in order that the function of reproduction may not be interfered with.

The operative technic that is employed to-day varies from a simple denudation of the vaginal mucosa with approximation of the margins with sutures, to the most extensive bladder dissection with invasion of the abdominal cavity.

The simple operation of denudation and approximation is only of use in removing hypertrophied and redundant tissue frequently present in the lower third of the vaginal wall as a result of exposure. It has no place in the cure of cystocele.

To Sims belongs the credit of first completely exposing the base of the bladder as is done to-day, although he abandoned it later for his V-shaped denudation. It is interesting to note that he did it accidentally while attempting to cure a cystocele by the very radical plan of clamping off the vaginal wall and the base of the bladder and cutting them away, intending to close the resulting vesicovaginal fistula by his classical technic. Fortunately, and to his surprise, he found that he had only removed the vaginal tissue, but he had also completely exposed the bladder base. He then sutured the vaginal walls together. This resection of the vaginal wall only corrects the injury of the transverse stretching and thinning in the median line, and therefore, frequently does not give satisfactory permanent results.

The Emmet operation and its modification by Baldwin depends upon the fact that the denudation exposes the firm tissue of the base of the broad ligaments on either side of the cervix, which areas are then approximated in front of that organ, throwing it backward and elevating the uterus and placing a firm buttress or support in front of it over the "weak spot" before mentioned.

The operation of Reynolds depends on the same principle. It is to be noted that these operations correct the tendency to prolapse

of the uterus by reefing the stretched broad ligaments and anteverting the uterus by throwing back the cervix, and they reinforce the weakened area in front of the cervix and midline, but in no way attempt to directly replace the overstretched bladder. At the most they close the door of escape without first reducing the hernia, whose overstretched base must necessarily be thrown into puckers or folds, and they do not restore the anterior vaginal wall to its normal attachment to the cervix.

Hirst, believing that the injury in cystocele was due to tears in the anterior vaginal sulci of the urogenital trigonum, advocated triangular denudation in the anterior sulci with suture, combined with a central colporrhaphy.

To Hadra belongs the credit of first calling attention to the necessity of elevating the bladder and restoring the normal invagination of the cervix by reattaching the vaginal wall high up on that organ. Sänger and Noble followed on the same lines and perfected the technic. Their operation was a marked advance in my opinion, although it does not provide for the correction of any associated prolapse of the uterus.

Goffe evolved a more radical operation of elevating the bladder in the pelvis, based on the principle of suspension. His operation of a wide free dissection of the bladder from the entire vaginal wall and uterus, opening into the peritoneal cavity with the suturing of the bladder high up on the body of the uterus and broad ligaments, is familiar to you all. Goffe recognized that the only way of eliminating the redundancy and increased length of the bladder wall at its base due to the overstretching, was to free it sufficiently to enable it to be rotated upward on the transverse axis, and to dispose of the excess higher up in the pelvis. I have had considerable experience with this operation and it is generally satisfactory in its results but requires extensive and usually unnecessary dissection. The technic described does not restore the invagination of the cervix, or dispose of the lengthened vaginal wall.

Recently much attention has been directed to the importance of the uteropubic fascial ligaments, the so-called "bladder pillars," in the repair of cystocele. Edward Martin's book with splendid illustrations of these fascial ligaments, although somewhat exaggerated, and the excellent monograph of Frank, have emphasized them as an important factor to be considered in the cure of cystocele. In the usual dissection, these tissues of the uteropubic fascial plane remain attached to the bladder wall, and in many operations are merely plicated by turning in and suturing this apparently thickened

bladder base, which must result in puckering and folding of the viscus. Rawls has advocated their thorough dissection and overlapping by mattress sutures. Bissell has devised a technic of overlapping the vaginal wall with its attached fascia and securing it with mattress sutures, to produce the required support for the bladder.

The technic as described by Frank and Rawls endeavors to meet the requirements of elevation of the bladder and reattachment of the tissues to the cervix, thus restoring the invagination, and of utilizing the fascial support of the uteropubic ligaments to strengthen the "weak spot," but does not attempt to correct prolapse of the uterus, or to antevert that organ.

The operation of wide dissection and overlapping of this fascia may be criticized as being entirely too complicated and tedious for practical use. The elaborate dissection of the fascia with the complexity of the suturing take up too much time with insufficient gain, especially as it must be combined with additional operative measures. I believe it is not practicable in all cases to separate the uteropubic fascial plane from the vaginal wall and bladder base. In many instances this fascial tissue is extremely thin and the fibers are widely separated, and the suturing together of the attenuated fragments, even though they are overlapped, gives a fascial support of uncertain value. Furthermore, the description of the technic would lead one to believe that some of the fascia dissected is the fascia propia of the vaginal wall, rather than the bladder pillars in some cases.

The operation of overlapping the vaginal wall with its attached fascia is likewise too complicated to be of practical use and the dependence on the overstretched, thinned vaginal wall and fascial fibers in the median line for support would seem unsound. Reynolds has laid stress on the importance of avoiding the use of the weakened overstretched tissues in the midline for support. Bissell's technic, however, would seem to correct prolapse of the uterus by shortening the base of the broad ligaments.

I do not believe that operations that chiefly depend upon the transverse shortening of the overstretched fascial fibers and vaginal wall can be relied upon to cure cystocele, especially when it must stand the test of child-bearing. The anteroposterior correction of the descent and elongation of the tissues is of far greater importance in my estimation.

Many other operations have been devised that have had a variable popularity such as those of Stoltz, Dudley, Doleris, Chaput, Polk,

etc., but as Frank said, the majority of the operations devised for cystocele depend upon ingenious denudations and complicated applications of sutures, rather than upon a firm anatomical basis. I would like to add, that they also fail to recognize the multiplicity of the injuries and the resulting changes in the tissues concerned.

To fulfil our requirements for an operation suitable for the child-bearing woman, we must, in my opinion, by whatever procedure we employ, accomplish the correction of all the injuries by the following essentials:

1. Mobilization and elevation of the prolapsed bladder in the pelvis, disposing of the enlarged bladder base.

2. Re-attachment of the vaginal wall and the "bladder pillars" to the anterior cervical wall, high up above the pivot point, thus angulating the vagina and using it as a tractor on the bladder base, at the same time disposing of its excess length and restoring the invagination of the cervix and anteverting the uterus.

3. Approximation of the attenuated fibers of the uteropubic fascia at the bladder base to give support in the center.

4. Resection of the excess thinned and stretched vaginal wall in the median line.

5. In cases complicated with prolapsus uteri, reefing of the elongated base of the broad ligaments, by approximation in front of the cervix, thus elevating the uterus and throwing back the cervix so that the uterus will become anteverted, in order that it may deflect intra-abdominal pressure.

In all cases complicated with prolapsus uteri sufficient to have an associated retroversion, I believe that shortening of the uterosacral and round ligaments is necessary in addition.

In my endeavor to fulfil these essential conditions, I have been adopting the following technic:

An inverted, ⊥ shaped incision is made on the anterior vaginal wall extending its entire length. The head of the ⊥ is carried out wide enough to uncover the base of the broad ligaments. The line of cleavage is found between the bladder and vaginal wall. The bladder is separated, not too widely at first, in order to develop the fascial pillars and not destroy them, as they are frequently very attenuated and more like connective tissue than fascia, and if at this stage the bladder is pushed upward in the midline off the cervix, the bladder pillars will stand out as a result of traction. Care is taken not to separate the vagina widely at or beyond the urethrovesical junction, in order that traction on the vaginal wall

will draw on the bladder base, thus straightening and elevating it. After the bladder pillars are discovered they are still further developed by dissection, revealing their relation to the base of the broad ligaments. In cases complicated with prolapse the base of the broad ligaments are freely exposed.

Unless there is some intra-abdominal condition necessitating invasion of the peritoneal cavity, the peritoneal reflection of the bladder is not opened. The bladder is next picked up with a forceps in the midline at such a point that when it is carried up to the anterior surface of the uterus above the internal os in the center, the base of the bladder is straightened out and the organ is revolved on its transverse axis, the excess due to stretching being carried up into the pelvis to become firmly adherent to the uterus in its new position.

These points on the bladder base and uterus being ascertained, they are sutured together with a catgut stitch after the technic of Goffe. I do not find it necessary in the average case to use three sutures to spread the bladder out on the broad ligaments as Goffe does. In very large cystoceles, however, I do not not hesitate to do so. The edges of the vaginal incision are then resected, widely at the cervical end, and narrow at the vesicourethral junction, to remove the overstretched and thinned-out vaginal tissue in the midline. Two sutures of catgut are then passed through the edge of the vaginal wall including the bladder pillar of the same side and through the uterine wall in the midline *above* the pivot point at the internal os close under where the bladder has been already attached, and out through the bladder pillar and vaginal edge of the other side. These sutures are placed in the vaginal wall at such a point that when they are tied they will completely straighten out the slack of the wall, causing it to make traction on the bladder base and bringing them in contact, and by the angulation produced will dispose of its excess length, the result of stretching.

If the case is one accompanied with prolapsus uteri, the head of the ⊥-shaped incision is extended laterally on the sides of the cervix sufficient to permit isolation of the lower part of the broad ligaments Under the guidance of the finger which is hooked under the ligament, a catgut suture is passed in the form of a mattress stitch, taking a firm hold of the strong lower portion of the ligament below the site of the vessels and ureter, well out on each side, and including the cervix low down in the midline, after the method of Alexandroff. When this suture is tied it will approximate the base of the broad ligaments in front of the cervix, reefing them and thus elevating the uterus and throwing back the cervix. After these three sutures are placed

and before they are tied, a continuous half hitch suture of catgut is used to bring together the fascial fibers of the bladder pillars under the bladder base. The mattress stitch of Alexandroff and the two angulation sutures are then tied, and the remainder of the vaginal incision closed with interrupted sutures.

In cases without appreciable prolapse and with the uterus well forward, it may not be necessary to reef the base of the broad ligaments as above described, but if there is any descent of the uterus whatever I think it wise to be on the safe side and do it.

Where a tendency for oozing of blood persists, I am sure a rubber tissue drain inserted between the line of suturing is a wise precaution, and will prevent the formation and possible infection of many a hematoma.

When an elongation of the cervix exists a low amputation should be performed.

The restoration of the function of the pelvic floor is of course an essential procedure in all cases, and if marked retrodisplacement is associated with the prolapse, I consider shortening of the utero-sacral and round ligaments necessary.

It will be seen from the above-described technic that I endeavor to correct all the injuries and deviations from the normal conditions as I appreciate them, by combining the principles of several operations. My technic might well be described as a combination of the methods of Hadra, Goffe, Martin and Frank, Alexandroff, and Sims, with the result of reducing the hernia, replacement of its supports by overcorrection, which is the principle usually employed in hernia operations, overcoming the excess of bladder base and vaginal wall both anteroposteriorly as well as transversely, with a restoration of the anterior invagination of the cervix, and the elevation and anteversion of the uterus. A composite operation is a necessity in view of the several factors concerned in this complicated injury. To rely on one principle alone for its cure invites failure as surely as it is true that "a chain is no stronger than its weakest link."

I am accustomed to speak of this operation as a "Cystopexy" rather than use the nondescriptive and unsuitable term in common use of "anterior colporrhaphy." The word "cystopexy" describes the general character of this operation and is as applicable as the word "nephropexy" in denoting fastening up the kidney.

In a trial extending over eleven years in which I have followed these principles in operating, my judgment of its value is, that if properly and accurately executed, it gives most satisfactory results and will stand the test of child-bearing in a fair proportion of cases.

I recognize the fact that the technic is not simple and that it requires some degree of skill and experience in plastic gynecic surgery, and that success is dependent upon careful attention to all the details.

I will epitomize the salient points which I wish to emphasize as follows:

1. The composite nature of the injury.

2. The operation should aim to correct all the lesions in order that there should be no weak link.

3. The necessity of mobilization and elevation of the bladder with a positive fixation.

4. The prime importance of disposing of the excess bladder base and the increased anteroposterior length of the vaginal wall, the result of stretching.

5. The restoration of the normal attachment of the vagina to the cervix to insure its invagination and to eradicate the "weak spot."

6. The attachment of the uteropubic fascial ligaments and the vaginal wall *above* the pivot point, so as to overcorrect the hernia and to insure anteversion of the uterus.

7. The technic should provide for correction of any associated uterine prolapse and retrodisplacement.

The problem of the cystocele is one that is so composite and complicated that it is a continual cause of unsettled argument and discussion. I know of no better way of getting more light on any subject than by an interchange of ideas and an appreciation of each others point of view. Therefore, I have the hope that my presentation of the opinions that I have formed on this hackneyed problem as a result of a somewhat extended practical experience, may stimulate a discussion that will be of mutual benefit.

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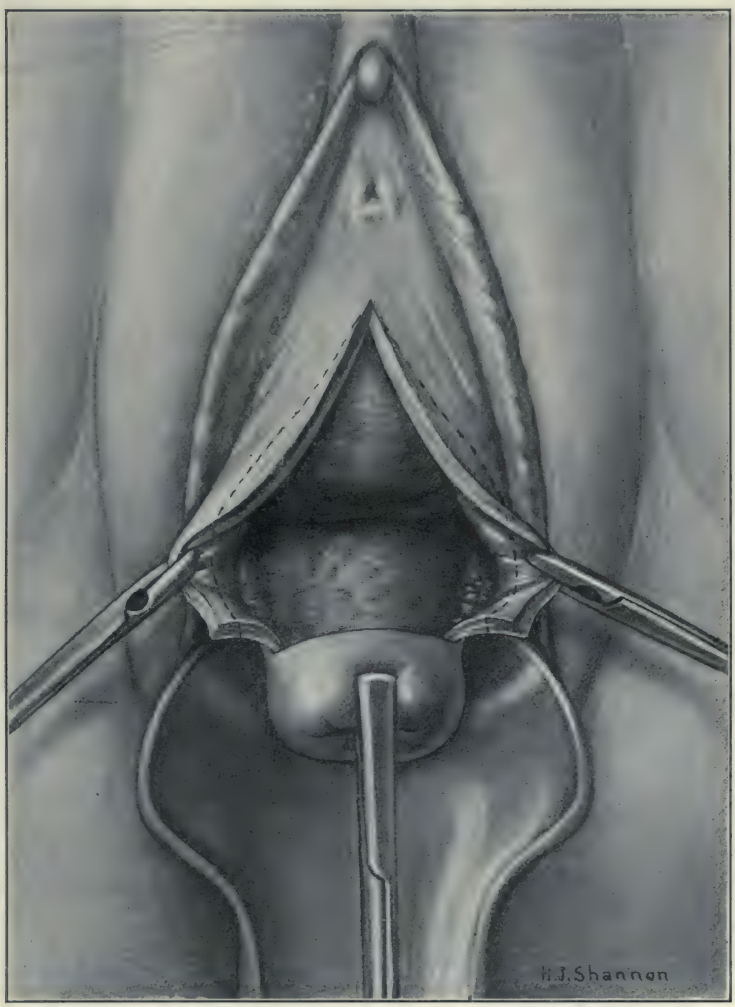

FIG. 8.— ⊥ shaped incision showing the separation of the bladder from the vagina and uterus and exposing the base of the broad ligaments. The bladder is not widely separated from the vagina at the urethrovesical junction in order that it may make traction on the bladder base. The dotted lines indicate the excess vaginal wall to be cut away.

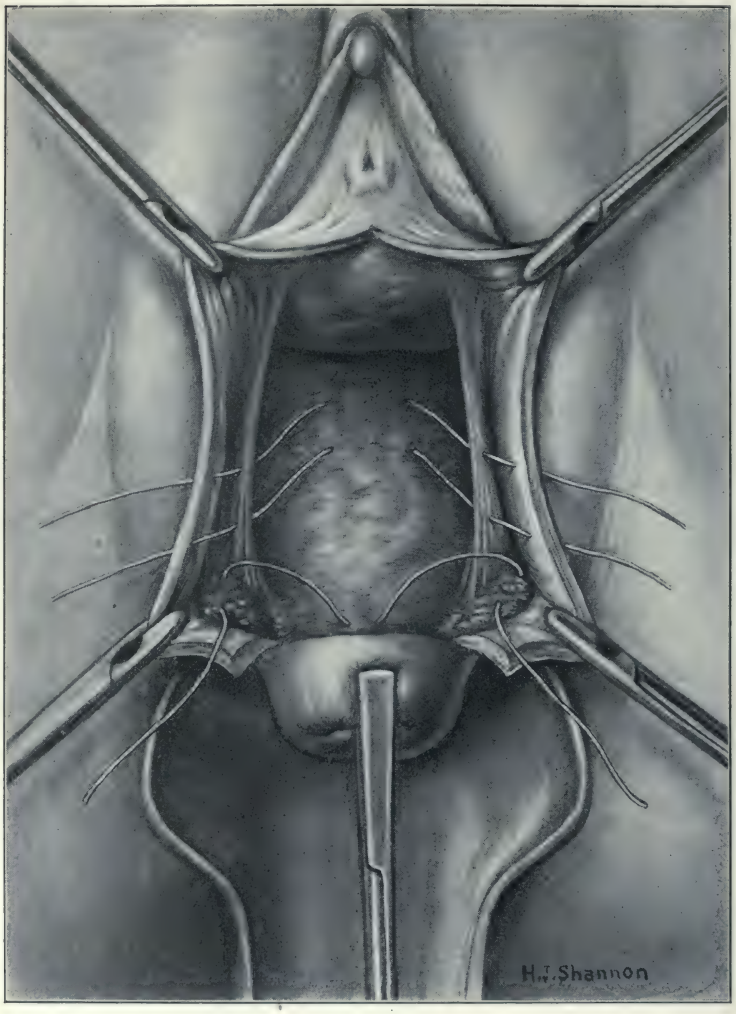

FIG. 9.—The dissection of the uteropubic fascial ligaments ("bladder pillars"), showing their origin from the base of the broad ligaments. The two angulation sutures in situ, passing through the vaginal walls, "bladder pillars" and uterine wall above the internal os. The mattress suture picking up the base of the broad ligaments on either side, and the cervix in the midline at a lower level after the technic of Alexandroff. When this suture is tied the broad ligaments are approximated and reefed, the cervix is thrown backward and the uterus elevated.

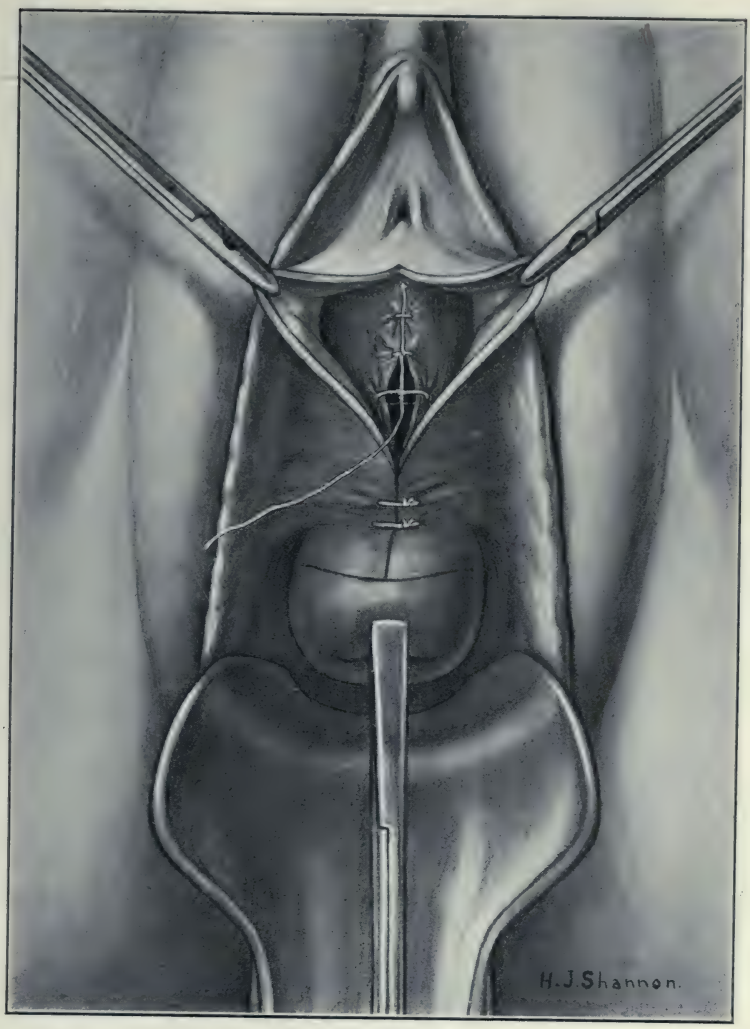

FIG. 10.—The two angulation sutures are tied. The Alexandroff stitch is not shown as it is buried. The uteropubic ligaments are sutured together with a lock stitch.

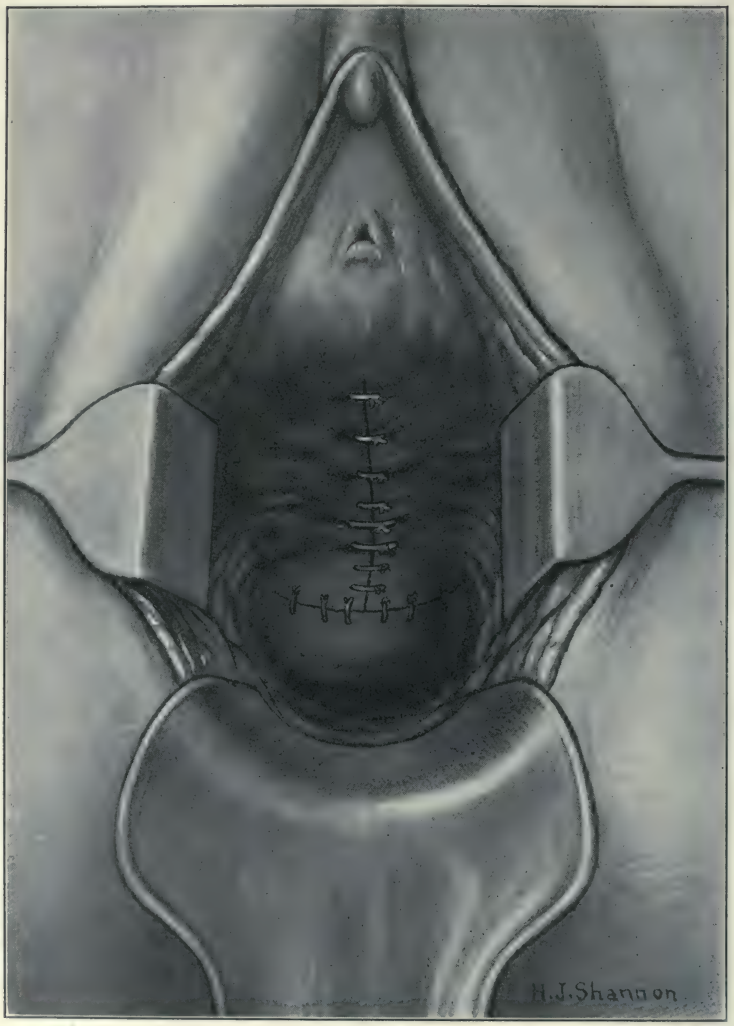

FIG. 11.—The ⊥ incision is closed by interrupted sutures. The anterior vaginal wall is now straightened, and the cystocele and prolapse have disappeared. The invagination of the cervix has been restored and the cervix points toward the hollow of the sacrum.

REPORTS OF TWO CASES.

ADENOMYOMA OF THE ROUND LIGAMENT FOLLOWING GILLIAM'S OPERATION.*

FIBROMA OF THE ANTERIOR VAGINAL WALL.

BY

LEROY BROUN, M. D.,

Attending Surgeon.

(With three illustrations.)

The history of this condition in the patient is as follows: Mrs. E. E., aged thirty-eight, married, has had three children, the youngest of whom is eight years old. She has always been in good health. Four years ago a Gilliam operation was evidently done together with a repair of the posterior vaginal wall. The result was in every way satisfactory.

I saw her for the first time on January 27th, she having been sent to me by her physician, Dr. J. Gardner Smith.

She gave me the above history and stated that the operation had been done by Dr. Harrington of Vassar Brothers Hospital, Poughkeepsie, who is now in the army; Dr. Harrington's absence prevented my communicating with him.

The patient complained of a tender mass in the abdominal wall near the site of the laparotomy wound. This mass had been present for the past one and three-quarter years. For the past ten months it had become periodically tender with each menstruation.

The pain would commence at the beginning of each menstruation and would increase in severity for ten days, although her period only lasted two days. At the end of the two weeks the pain would cease and she would be free from it until the commencement of the next menstrual period. This periodical pain had continued as stated for the past ten months and the fear of cancer caused her to seek relief.

The examination gave a small tender mass of some 2 or 3 cm. in size, situated 5 cm. to the right of the abdominal scar. The mass was superficial in character and had the feel of existing above the fascia. Its location was in the site of a Gilliam implantation of the round ligament. The uterus was in excellent position and the posterior vaginal wall well repaired. The patient was told that the condition was probably a cyst of the round ligament.

The operation done on the following day was not easy. A part of the tumor existed above the fascia and was cystic. The larger part was within the rectus muscle and necessitated a removal of some of the fibers before the tumor could be taken away. The dissection was continued to the peritoneal fascia. The unaffected part of the round ligament was readily recognized and was reimplanted to the united fascial edges.

The pathological report of the specimen is as follows:

Path. No. 16354.

* Published in the *American Journal of Obstetrics*, April, 1919.

Specimen—Cyst of round ligament.

Diagnosis—Adenomyoma of the round ligament.

Macroscopical.—A hemorrhagic shaggy piece of tissue 3.5 cm. by 2 cm. The center of the growth is composed of a yellowish fibrous, fairly soft tissue. The periphery contains a few small cyst cavities.

Microscopical.—The section shows irregularly arranged bundles of smooth musculature enclosing numerous islands of glandular tissue surrounded by a loose cytogenic tissue. The periphery of the tumor is hemorrhagic and small bundles of striated musculature are attached to the tumor. There is a moderate inflammatory reaction present within the cytogenic cell masses. The epithelium lining the glands is low columnar. It is not ciliated; shows no distinct basal membrane except in a few places.

Cullen, in the March, 1916, *Surgery, Gynecology and Obstetrics*, states that in 1896 it fell to his lot to report the first case of adenomyoma of the round ligament and states that since this report a number of such conditions in the round ligament have been recognized. The subject of Cullen's article above referred to was the coincidence of an inguinal hernia with an adenomyoma of the round ligament of the same side. He states that the increase in size of the inguinal nodule at each period led him to make a tentative diagnosis of adenomyoma.

In the case I am here reporting the patient did not note any perceptible increase in the size at menstruation but did have increasing pain, not subsiding until two weeks after menstruation.

I append a microphotograph of a section of this tumor furnished by the Pathological Department of the Woman's Hospital (Fig. 1).

FIBROMA OF THE LOWER THIRD OF THE ANTERIOR WALL OF THE VAGINA.

I report the occurrence of this condition in a patient coming under my care at the Woman's Hospital on account of its rarity. In my gynecological practice this is the first case of such a character that has come under my observation.

The history is as follows: Miss N. K., aged forty-one, single. Her menstrual history commenced at fourteen and has been normal in time and amount, without pain. It is of a twenty-eight-day type, soiling two or three napkins at each period. The last period was on Jan. 8th, 1919. Her general health has always been good, having had only the usual infective diseases of childhood.

The present illness began in March, 1918, when she first recognized a small mass at the vaginal outlet. This when first felt could be pushed back. There was a white odorless discharge, which at times became mildly hemorrhagic in character, especially during the last few months. The patient thinks that the growth has increased rapidly during the last month. The menstrual function as stated has always remained normal.

The patient was seen on January 18th at the hospital. The appearance of the mass at this time is best described by the photo-

graph which I present. The dark eroded area on the right which is probably due to friction, had every appearance of bladder mucosa. The examination showed that the tumor was well defined, not involving more than the outer one-third of the anterior vaginal wall, and existed chiefly under the urethra (Fig. 2). The consistency was soft. No fluid could be withdrawn with the exploring needle.

Various diagnoses were made of the character of the growth. My own was that of a solid tumor of the anterior wall. Its removal was without difficulty, the mass being shelled out of its capsule, which extended well up in the sulci on each side of the urethra.

The pathological report was as follows:

Path. No. 16334.

Diagnosis—Fibroma of the septum vesicovaginale.

Macroscopical.—An oval tumor with a thick pedicle. The tumor measures 6 cm. by 4 cm. It is well capsulated, one pole is covered with a small piece of ulcerated vaginal mucosa. The pedicle, measuring 4 cm. in length by 1 cm. in diameter, is attached to the other, pole. On section one sees that the tumor is composed of a fibrous yellowish tissue (Fig. 3). The tumor mass is well defined toward the connective tissue which separates it from the vaginal mucosa.

Microscopical.—Section shows vaginal wall with broad squamosa. The tumor which is well separated from the subvaginal tissue is composed of masses of fibrous cells densely packed and in certain places showing a fair number of mitoses and large dark staining nuclei. The number of fibrillæ is comparatively small. The tumor is sharply defined toward the surroundings.

Richard R. Smith, in an article on this type of growth, in which he reported a case coming under his care, in 1901 collected reports of forty-six cases in addition to fifty-four previously reported by Kleinwächter. In the 101 cases reviewed by Smith, twice as many were located in the anterior vaginal wall as in the posterior.

Pierre Jacobie has written an extensive thesis upon this subject which appears in the volume of Theses of the Faculte de Médecine de Paris, 1908–09.

He refers to Richard Smith's collection of cases and also adds twenty-two cases collected by himself. In this thesis he states that myomatous tumors of the vagina are extremely rare, in almost every instance being pure fibroma. The size of these tumors also varies greatly and he cites one instance of a case reported by Baudier of 10½ pounds and also of another by Grember of 5 kilograms.

He is inclined to accept the theory that the presence of these tumors in the vagina can only be explained on the basis of being migratory in character, either sessile or pedunculated. I doubt very much however if we can accept this conclusion, for unquestionably fibroma of the vagina exist in which there is no evidence of a similar condition existing in the uterus.

In the case I here present the tumor occupied the outer third of the anterior wall of the vagina and the uterus itself was small without any suspicion of the myomatous growth within it.

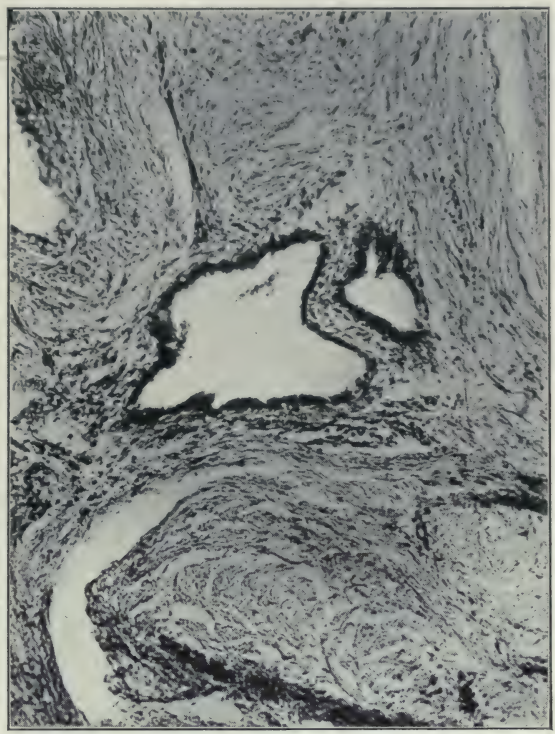

FIG. 1.—Adenomyoma of the round ligament following a Gilliam operation four years previously for a displaced uterus. (Broun.)

FIG. 2.—Photograph of a pure fibroma of the third third of the anterior wall of the vagina. (Broun.)

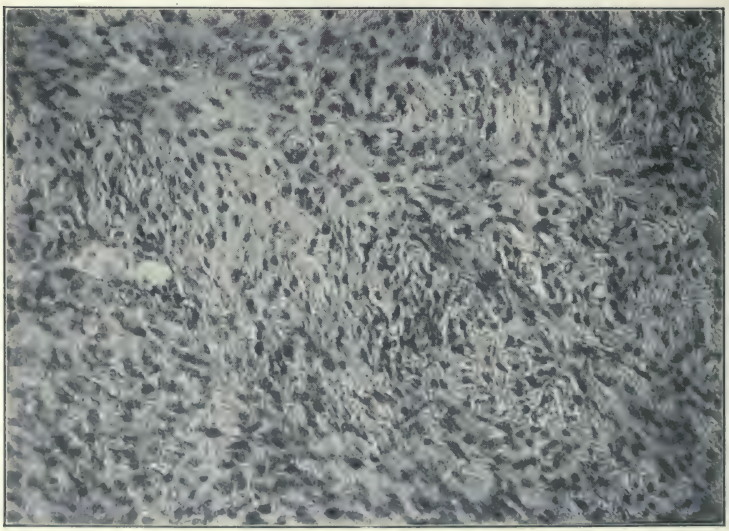

FIG. 3.—Section of fibroma from anterior vaginal wall. (Broun.)

TWO CASES OF ABDOMINAL (ECTOPIC) PREGNANCY OPERATED UPON NEAR TERM WITH LIVING CHILDREN.

BY

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(With two illustrations.)

THESE two unusual cases occurred in the writer's experience during a period of about six months. In certain respects there were marked points of similarity.

The first case which is now described in greater detail, was briefly reported to the New York Obstetrical Society on October 9, 1917, and is published in the form then presented in the AMERICAN JOURNAL OF OBSTETRICS, of January, 1918.

CASE I. Mrs. A. M., American, twenty-nine years old.

Her father died of pneumonia, her mother of "heart trouble." Previous history shows pneumonia at age of four and scarlatina seven years ago.

The menses were established at the age of twelve, always regular, every twenty-eight days, flowing five days, amount moderate. At times there were pains in the lower abdomen and backache.

Marriage took place in January, 1916. In April the patient thinks she had a miscarriage, having gone two weeks overtime, and then flowed for one month.

In May, June and July the flow was normal, the July period commencing on the 23d. In August there was no menstruation at the regular time, but about the last of the month there began to be a spotting, and this appeared daily until the last of September. During this time there was nausea and vomiting and some pain which continued until entering the Hospital.

In September the patient noticed two hard lumps in the lower abdomen. Her abdomen progressively enlarged and was always tender. About the last of February her feet and legs began to swell.

The urine examination on February 13th was normal, but by March 13th there was a marked quantity of albumin with many hyaline and fine granular casts. Notwithstanding restricted diet the April 1st specimen showed albumin 5 grams per liter, and frequent fine and coarse granular casts.

She was admitted to the Woman's Hospital April 4th, because of the albuminuria. Notwithstanding the usual dietary and rest treatment there was but slight improvement. The blood pressure

continued moderately high; systolic 158, diastolic 108. After three weeks in the hospital without any relief from the toxemia and because of the presence of several fibroids apparently in the lower uterine segment it was determined to deliver by Cesarean section.

The operation was done on April 23d, within one week of term. Under ether anesthesia the abdomen was opened on the median line, midway between the ensiform and pubes, and a tumor was exposed slightly adherent to the omentum and covered with large vessels. The tumor was steadied in the midline by the assistant, and incised. A thin sac wall was entered and fetal membranes protruded. It was now clear that we were dealing with an ectopic sac. The membranes were broken and the child extracted. Profuse bleeding occurring, the sac was rapidly freed from omental adhesions by ligature and cutting, and was drawn up out of the abdominal cavity. It was found to be connected with the right broad ligament, apparently an extension of the same. By clamp and ligature close to the base of the ligament the sac was completely extirpated. Examination of the uterus showed it enlarged to the size of a three months' pregnancy, with four substantial fibroids in the posterior wall. A pedunculated fibroid about the size of a small grape fruit was attached to the left horn and one somewhat smaller to the right.

The uterine mass with its attached tumors was removed by clamps and ligature, leaving only the left ovary and the cervical stump. The broad ligament wound was sewed over with a continuous catgut suture, and after all bleeding was controlled the abdominal incision was closed in layers.

The fetus, which was moderately narcotized, breathed well after ten minutes manipulation. It was a female, weighing 6 pounds and 14 ounces. The only anomaly was a slight talipes calcaneus, with trifling contracture of the great toes.

The fetal sac seemed to be composed of the two layers of the broad ligament, fortified by a diffuse placenta. Large varices, the size of English walnuts, were at the placental attachment of the funis.

The pathological report was as follows:

Intraligamentary tubal gestation, full term. Entire gestation sac in the abdominal cavity. Decidual reaction of the tubal mucosa.

Macroscopical.—Uterus without cervix. The uterus is changed into a hammer-shaped body measuring 8 cm. in length (the corpus only). The upper frontal diameter is 17 cm. This enlargement is due to several (5) large myomata embedded in the lateral portion of the endometrium. The largest one measures 7 cm. in diameter. The adnexa and the thickened round ligaments are severed from the corpus uteri at a distance of about 2 cm. The tube dilates into a nodule of 3 cm. in diameter at its attachment to the uterine cornu.

Besides this a full-term placenta with umbilical cord and membranes was received. The outer surface of the membranes is covered with adhesions and broad bands of a membraneous tissue. The entire fetal sac with its contents is said to have been connected

with the uterus by the pedicle mentioned above. The entire mucosa is changed into a villous yellowish tissue. The myometrium is edematous and widened.

Microscopical.—Sections from the uterine mucosa show a large number of uterine glands in the myometrium. A decidua compacta et spingiosa, semi-necrotic.

Another section shows distinct muscle bundles of the round ligament. Between the septa one finds numerous small tubules lined with low columnæ epithelium. The cells show no cilia.

The other section shows tubal mucosa of the isthmic portion with a hypertrophic musculature. There is extensive decidual reaction of the stroma of the mucosa and of the stroma of several collapsed cystic cavities.

The distinct decidual reaction is strong evidence that pregnancy originated in the tube.

The patient made a normal convalescence and was allowed out of bed on the twelfth day. On the fifteenth day the temperature rose to 101.4° F., and there developed a left femoral phlebitis. This subsided satisfactorily, and on the twenty-seventh day the mother and child were discharged in good condition. The baby at first was slow to gain, but left the hospital weighing 6 pounds, 14 ounces and in excellent condition.

The child at present date (twenty-two months old) is normally developed and rather more advanced than children of that age (Fig. 1).

The second case was first seen in consultation with Dr. Howard Gillespie Myers on September 28, 1917.

She gave a history of sudden severe pain referred to the right side of the abdomen. There was quite severe shock, as shown by a feeble accelerated pulse. This condition came on at night, and at first suggested sudden separation of the placenta. Under morphine her pulse improved markedly and we felt that the absence of uterine contraction ruled out any considerable intrauterine hemorrhage. The patient was then about seven months' pregnant. She improved rapidly, and on October 19th was able to come to my office for examination. Here was obtained the following history:

She was thirty-nine years old, and had been married four years. In that time, until the present pregnancy, she had not conceived. Her family history was good. Childhood had been healthy. Twelve years previously had had appendicitis. Eight years ago had removal of tonsils for quinsy sore throat. The menses were established at fourteen years, regular in occurrence, with a flow of three to seven days. There had been pain at first. The last menses had occurred in February, beginning on the 22d. During the second and third months there had been nausea and severe pain in the right side. At this time she had been in a hospital in a western town, and had been told that she had an ectopic pregnancy, and operation was urged.

An older physician had overruled this diagnosis, stating that pregnancy was normal. Life was felt in July. Abdominal examination showed a central mass enlarged to extent of seven and one-half months' pregnancy. The fetal parts were easily felt. The vaginal examination showed a presenting part, evidently the head, in the vaginal vault. Above the lowest presenting part and leading to the right the cervix was felt. The tip of the finger could be carried into the cervix for nearly an inch. On two occasions a probe was passed into the uterus, demonstrating that the uterine cavity ended at a point 10 cm. from the os.

A diagnosis of advanced ectopic pregnancy was made and the patient kept under close observation.

On November 9th, because of moderate albuminuria, she was sent to the hospital and kept on a careful diet.

The operation was on November 17th, twelve days before the estimated term. A median incision 7 inches long, extending from a point 3 inches above pubes to about 4 inches below the ensiform, was made. The peritoneum was incised exposing the fetal sac, which showed several light adhesions to the omentum. The presenting portion of the sac was incised and the hand, passing through the placental tissue, seized the fetal head and extracted the child. The child was a female infant, weighing 4 pounds 11 ounces. It was moderately cyanosed, and did not breathe at once, but responded to methods of resuscitation, crying well in ten minutes.

The incision in the fetal sac was closed by clamps, and the sac drawn out of the abdominal cavity. The omental adhesions were cut between ligatures. The sac, which was traced down to its origin in the left broad ligament, was clamped off from the horn of the uterus and excised. Bleeding points were controlled by ligature and suture, and the edges of the broad ligament sewn together.

On the right side near the cecum the sac was extensively adherent to the intestine. In the midst of this was a small mass of brownish blood clot. This was obviously the cause of the attack of pain and faintness which occurred the previous month when the patient was first seen.

The sac was separated by blunt dissection from the agglutinated intestines, and the clot removed. This hematoma was also walled in by the fundus uteri, which, moderately enlarged, extended upward in the right iliac fossa. A tear in the peritoneal coat of the uterus, caused by this blunt dissection, was closed by catgut. The abdomen was then closed. The operation, under gas and ether, lasted forty-five minutes.

Pathological Report.—Placenta and membranes from ectopic (intraligamentary) gestation.

Received a placenta with a few ragged pieces of hemorrhagic tissue attached to its edges. The latter measures 11 cm. in diameter. The umbilical cord shows marginal insertion. The surface of the placenta is covered with a smooth whitish membrane. This membrane, which apparently represents the thinned out tubal wall, covers the maternal side of the placenta.

Microscopical.—Section from this portion shows a muscularis cut transversely and longitudinally. There are a number of structures resembling plicæ, and one of them shows a marked decidual reaction in its stroma. Certain large tissue spaces which possibly represent false glands contain masses of small cells of an indefinite type.

The postoperative history was excellent. The highest temperature was 100.6 deg., but for ten days the pulse ranged above 100. On the twenty-third day mother and baby went home in good condition.

The infant could get no breast milk from the mother, but was given human milk up to the sixteenth day, and then fed on modified milk. She showed no anomalies, and on discharge weighed 10 ounces above her birth weight.

The child has developed normally (Fig. 2).

These cases were similar, in that both were intraligamentous, and it was their great good fortune that the placentæ in both developed over the walls of the broad ligaments and not over the large vessels or the floor of the pelvis. This simplified the operator's technic. They both showed albuminuria.

In the first case, the presence of large fibroids added to the difficulty of diagnosis. Both patients showed consistent abdominal tenderness. The partial rupture in the second case at seven and one-half months demonstrates one possible risk in postponing operation until the maturity of the fetus.

The good maternal and fetal results in these cases bears out the contention of Cragin and Sittner that the life of the child in advanced ectopic gestation is worthy of consideration.

FIG. 1.

FIG. 2.

REPORT OF A CASE OF FULL-TERM ECTOPIC PREGNANCY.*

BY

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MRS. X, a primipara, aged nineteen, first seen in the twenty-second week of her pregnancy. At six weeks a catheter or sound was introduced which for several days caused considerable bleeding and clots. It was supposed an abortion had been accomplished, until four days before consulting me, when her abdomen had suddenly enlarged. On examination the uterus was symmetrically enlarged and the fundus was just above the umbilicus and a placental bruit was distinctly heard. Therefore a diagnosis of intrauterine pregnancy was made, but further advanced than the history indicated.

Five months later or about seven days before full term, I saw the patient in consultation. She had been in good condition until the previous week when she was attacked with pain over the gallbladder region accompanied by nausea, vomiting, constipation and the voiding of small amounts of high colored urine. At this time the skin was slightly jaundiced and patient was treated by catharsis, diet and colonic irrigations, but without benefit. When seen her temperature was 101, pulse 144 weak and irregular and respiration 30 and difficult. There was a distinct surgical abdomen and palpation revealed, extending from the upper left quadrant to the umbilicus, a firm tumor mass which shelved off into an indefinite cystic mass. Percussion gave dulness which was well marked in the flanks. On the left side, just below the umbilicus, a fetal heart was heard and below this a placental bruit. Vaginal examination showed the cervix displaced to left, the external os admitting the tip of the finger only to the internal os. Posterior to cervix a cystic mass was felt with an indefinite firmer mass above and to right and below the level of the internal os, there presented a smaller hard mass suggestive of a fetal small part. A tentative diagnosis was made full-termed pregnancy complicated by toxemia with either an incomplete rupture of the uterus, or a twisted pedicle ovarian cyst. Extrauterine pregnancy was ruled out because of my findings at the fifth month.

Patient was sent to the Woman's Hospital and about seven hours later temperature was 101.2, pulse 144 and respiration 36 and the fetal heart was again distinctly heard. Eight hours later, patient's condition was much improved, temperature 100.2, pulse 138 and respiration 30, vomiting had ceased and the urine was increasing in amount and only showed marked traces of albumin. At this time the fetal heart was not heard and no fetal movements were ob-

served. As the mother was now only to be considered, operation was deferred.

The next day patient was markedly improved, temperature 99, pulse 130, and respiration 30. The blood examination gave red cells: 3,528,000, hemoglobin: 52 per cent., white blood cells: 10,400, with polys: 73 per cent. and lymphocytes 27 per cent. Twenty-four hour amount of urine, 2200 c.c., trace of albumin, no acetone, no diacetic acid, urea: 0.63 per cent., 12 gm. in 24 hours. Blood Analysis showed carbon dioxide in blood 23, urea marked reduction, too low to read. At this time Dr. F. A. Dorman saw the patient in consultation and advised further waiting as he thought the case one of probable full-term ectopic gestation.

On the sixth day after admission to the hospital, an abdominal section, under nitrous oxide and oxygen anesthesia was done. A further examination at this time failed to throw any further light on the case. As there was considerable vaginal bleeding, from the preparation and examination, necessitating a vaginal pack, a sound was not passed into the uterus.

A median incision was made from five fingers below to three fingers above umbilicus. The first incision through the peritoneum was followed by a gush of bloody serum escaping under considerable pressure. The incision was then enlarged and revealed a fetus with its head toward the left of the sternum showing distinctly through a thin sac. The fingers were passed rapidly around this sac which was thicker posteriorly and it was found to be adherent at intervals to the omentum, the large intestine and the lateral parietal peritoneum and that its pedicle was in the region of the left broad ligament. The thin membrane anteriorly was then opened and a considerable amount of amniotic fluid was evacuated and a full-term child extracted. On separating the adhesions, it was found that the pedicle was at the site of the left tube and the upper part of the broad ligament above the ovary and extended to the uterine horn, but did not involve the fundus of the uterus. With three uterine clamps the pedicle was firmly held and the placenta and membranes were removed with a minimum loss of blood. It was found that the uterus was enlarged to the size of a four months' pregnancy and had been carried backward, upward and to the left. The pedicle was then secured with ligatures and sutures and portions of membrane were now removed from the omentum, intestines and peritoneum without any undue loss of blood, and abdomen closed without drainage. The patient made an uneventful recovery and was out of bed the fourteenth day.

The pathological report was as follows:

Diagnosis.—Tubal gestation, full-term child (macerated). General anasarca of the infant.

Macroscopical. Child and Placenta.—Macerated female infant weighing 9¼ pounds. The child shows no deformity, is 55 cm. long. There are all signs of maturity. No caput succedaneum. *Placenta with Cord.* The former shows two portions, one measuring 15 cm. in diameter which is about 3 cm. thick. The maternal

side shows a very short, thick pedicle which is apparently composed of musculature. This thicker portion of the placenta goes over into a thin disc-like structure measuring 18 by 12 cm. being about 1 cm. thick. The maternal part of this latter tissue is smooth. The membranes are attached to the placenta. The umbilical cord shows serohemorrhagic infiltration.

Microscopical.—Sections from the pedicle show an edematous smooth musculature. Other sections show placental tissue, some of it attached to thin strands of smooth musculature, probably tubal. No sections show mucosa; no evidence of uterine musculature. The placental villi are largely macerated. A large part of them is degenerated.

The section of the infant shows a serohemorrhagic transudate in the abdominal, the pleural and the pericardial cavities. The cheeks and the eyelids show marked anasarca. The brain itself is macerated, extremely soft. The internal organs show no anomalies.

CYSTS OF THE CORPUS LUTEUM.*

BY

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(With five illustrations.)

Cysts of the corpus luteum were first described by Rokitansky. The diagnosis of these cysts has been greatly favored by exact histological examinations which were still further facilitated by the recognition of the various stages in the formation and regression of the normal corpus luteum. Our theme concerns cysts of the corpus luteum, specifically omitting any detailed discussion on cysts formed in lutein tissue in general. It will, therefore, not include the well-known lutein-cystoma occurring in cases of hydatid moles or chorioepithelioma which we have dealt with extensively in a previous paper.

The cysts of the corpus luteum vary in size from about 1 cm. diameter to the size of a child's head. Such large cysts, however, are rare and the most common types are those from 3 to 6 cm. diameter. They are almost always lined with a smooth or slightly corrugated light gray membrane, they never contain any papillations. The contents of the cyst cavity show an amber color or, in proportion to the admixture of blood, irregularly distributed purple areas which give the semisolid gelatinous nucleus of the cyst its characteristic appearance. The partially liquid gelatinous contents are composed of network of fibrin in the meshes of which clots of albumin and red cells, mostly altered, are suspended. In contradistinction to the loose clots found sometimes in serous cysts, one finds the gelatinous contents of corpus luteum cysts filling the entire cavity and adherent to the inner surface of the cyst wall, due to the compression of fibroblasts toward the periphery. The histological structure of this corresponds to the stage of corpus luteum formation in which the metamorphosis into a cyst took place. The width of follicle-lutein cell is dependent on the phase of lutein-cell formation during which the further regular structural changes were arrested when the corpus luteum was converted into a cyst. But this statement must be restricted to young cysts only since the lutein-cell

* From the Pathological Laboratory of the Woman's Hospital, New York. Published in the *American Journal of Obstetrics*, April, 1919.

layer disappears completely in older cysts, leaving only a wavy or even straight fibrous membrane poor in cells, largely hyaline, and lacking in any kind of epithelial lining. This latter fact is fairly significant although there are follicular and serous cysts which often show no lining epithelium. The former cysts, however, are bound by dense ovarian stroma, while the latter very seldom show a fibrous inner wall resembling the fairly characteristic band of hyaline fibrous tissue found in corpus luteum cysts. It is, therefore, in most cases of cysts, even without lutein tissue in the wall, not difficult to diagnose one of the previously mentioned kinds and to distinguish corpus luteum cysts from them. The lutein cystomata occurring bilaterally, in connection with hydatid mole and chorioepithelioma, are always multilocular on account of their origin from several centers of lutein-cell formation (atresic follicles, lutein hyperplasia during pregnancy) (L. Seitz).

The corpus luteum cyst must be classed as a retention cyst and it is capable of proliferation in the sense in which one speaks of neoplastic structures originating from serous or pseudomucinous cysts. There are evidences that these cysts cannot form before a fibroblastic layer has been deposited on the lutein cells of the corpus luteum. Real cysts always show an inner lining of fibroblasts on top of the lutein-cell layer. From the above mentioned phase on, one finds lutein cysts formed with the structures typical of the stage of metamorphosis. Even corpus albicans cysts are not infrequent. They usually do not measure more than 2 or 3 cm. in diameter and might, on superficial inspection, be confused with fibromata of the ovary since the cyst cavity itself is comparatively small.

The corpus luteum cyst shows specific properties which do not seem to be fully appreciated by the clinician. It is evident that in order to judge its clinical significance, one must be able to recognize the corpus luteum cyst on macroscopical inspection. A few points have already been mentioned which might assist in diagnosing the cyst formation correctly. Yet, if the least traces of a lutein layer are absent, the diagnosis often cannot be made without the use of the microscope. The lack of papillations, the fact that the corpus luteum cyst is practically always unilocular, the presence of a semiliquid, often hemorrhagic gelatinous clot, are of importance (Figs. 1 and 2). The whitish, very thin lining membrane cannot be separated from the surrounded ovarian stroma as in serous cysts. The corpus luteum cyst is never intraligamentory, its size is limited. Corpus nigrum cysts which differ macroscopically only in their contents are characteristic enough on account of the pitch-like dark

brown or black grumous material filling the cyst cavity (Fig. 4). A frequent occurrence is abscess formation in corpora lutea which changes the ovary into a pyovarium. It is, however, improbable that this transformation can occur after a uniform fibrous membrane lines the cyst cavity. In most cases of corpus luteum abscess one cannot offer any certain proof of this particular change since lutein cells and hyaline membrane are completely replaced by a granulation tissue.

It is of clinical importance that the cyst wall is rather fragile and liable to burst during bimanual examination, a fact well known to most gynecologists. Since the contents are sterile and the cyst does not recur, it matters little if such an accident happens. This fact is probably responsible for the divergence of opinion that occurs when one examiner diagnoses a cyst and ruptures it unintentionally, so that the succeeding examiner denies the presence of any pelvic tumor.

In order to understand the histogenesis of the various forms of corpus luteum cyst one has to refer to the histological elements composing the cyst wall (Fig. 3). The lutein cells, if present, are derived from granulosa cells and, in certain cases, one is able to find, as in ordinary corpora lutea, the remnants of slightly altered granulosa cells in one portion of the cyst wall. This necessitates the assumption of an irregularity in the normal cycle of changes, a rather frequent occurrence in corpora lutea. The fibrous, later hyaline membrane, is formed from fibroblasts deposited on the inner surface of the follicle lutein layer and the fibroblastic cells are probably derivatives of endothelial cells lining the numerous young capillaries between the columns of lutein cells. One cannot very well assume that the theca-lutein cells which radiate from the periphery of the corpus luteum toward the liquid, semiliquid or hemorrhagic nucleus of the corpus luteum furnish fibroblasts.

Schroeder found in corpus luteum cysts a single layer of endothelial cells lining the fibrous layer. I have been unable to demonstrate this layer although a flattened continuous line of fibroblasts might give that impression. Histogenetically these two elements are of the same origin. The red cells in the cystic center as well as the lutein cells in the wall disappear in the course of time, the latter take up large amounts of fat and seem to become absorbed rather rapidly. The fluid which is present in normal corpora lutea is completely absorbed during the formation of the corpus albicans.

This fluid (plasma) probably cannot be absorbed as rapidly because a rigid hyaline membrane lines the nucleus of the corpus luteum.

It is hardly conceivable that the amount of cyst fluid can be increased after that event since its production seems to be dependent on hemorrhages and the numbers of the capillaries formed in the early stages of the corpus luteum formation. It is generally asserted that secondary hemorrhages in the corpus luteum wall occur at the onset of menstruation or just before that time (Marcothy, R. Meyer). This latter incident might possibly increase the amount of fluid or it might be responsible for the pigmentations one finds in cystic corpus luteum as well as in corpus albicans. That extensive hemorrhages (secondary) must be responsible for the pitch-like mass found in corpus nigra, must be conjectured since there is no other obvious reason for the formation of so large an amount of the hematogenous pigment.

The amount of fluid collecting in the cavity of the burst follicle and the rapidity with which the fibrous lining membrane is formed, are responsible for the formation of the retention cyst; the secondary hemorrhages explain corpus nigrum cysts. The follicle lutein cells are naturally not a permanent structure. They disappear within a certain time. It is plain enough that lutein cysts are far more common then they are diagnosed, since one generally confuses them with other cysts having serous contents. Epithelium is very seldom found (E. Fraenkel, L. Fraenkel). When it occurs, it is probably secondary to invasion from the germinal epithelium of the ovarial surface (E. Runge). Among several scores of lutein cysts we have seen only one with an interrupted lining or irregular nonciliated cuboidal cells, generally larger than germinal epithelial cells. The irregularity in size of the cells and nuclei suggested the presence of foreign cells.

The resorption of lutein cells is preceded by pycnosis of the cell nuclei; the protoplasm becomes vesicular, entirely transparent and disappears first so that the stroma underneath the hyaline fibrous layer sometimes contains a number of nuclear fragments without any other parts of the lutein cells. One never sees any signs of necrosis nor detritus. The vesicular, irregular cell forms are due to vacuolization (Fig. 5).

CONCLUSIONS.

The foregoing article describes the histogenetic mechanism of the formation of lutein cysts without referring to its ultimate etiology. The histological particulars of these cysts permit of a correct diagnosis even if no traces of lutein cells are found. They form a distinct clinical entity in so far as their macroscopical and microscopical recognition is of importance in reference to the prognosis of the

case. The relationship of the cysts of the corpus luteum, the corpus nigrum and the corpus albicans, have been considered with regard to their probable origin.

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FIG. 1.—Corpus luteum cyst with corpus luteum of pregnancy at the edge of the cut cyst wall (⅔ natural size).

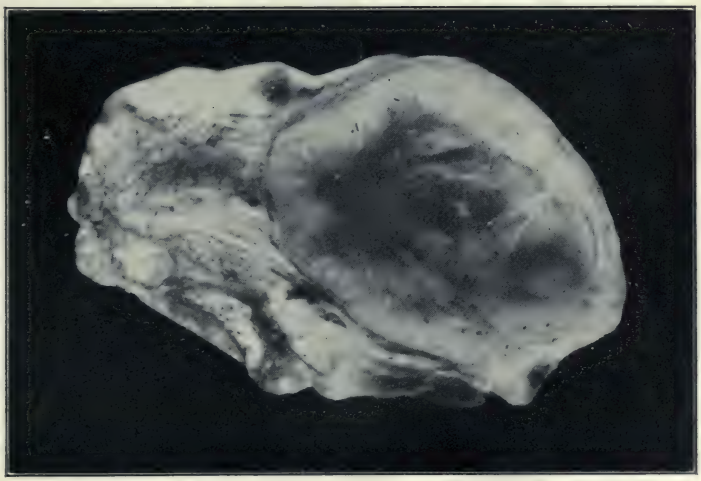

FIG. 2.—Cystic corpus luteum of pregnancy (×2 natural size).

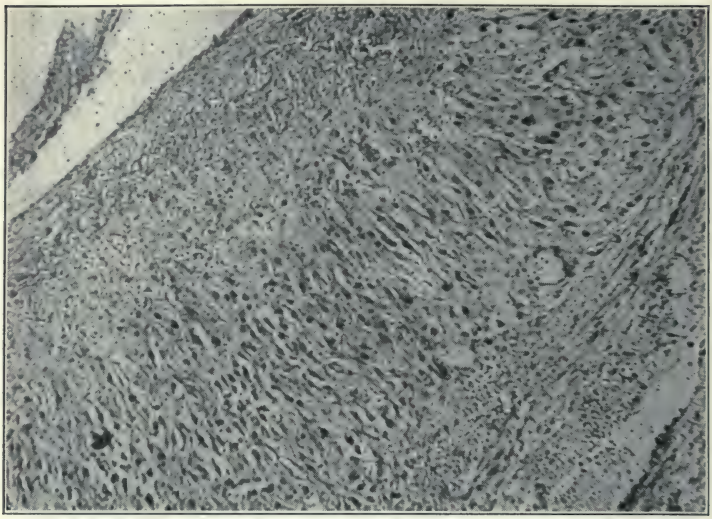

FIG. 3.—Wall of corpus luteum cyst (medium magnification). Hyaline fibrous tissue lining cyst wall. Underneath broad layer of lutein cells with beginning regressive metamorphosis.

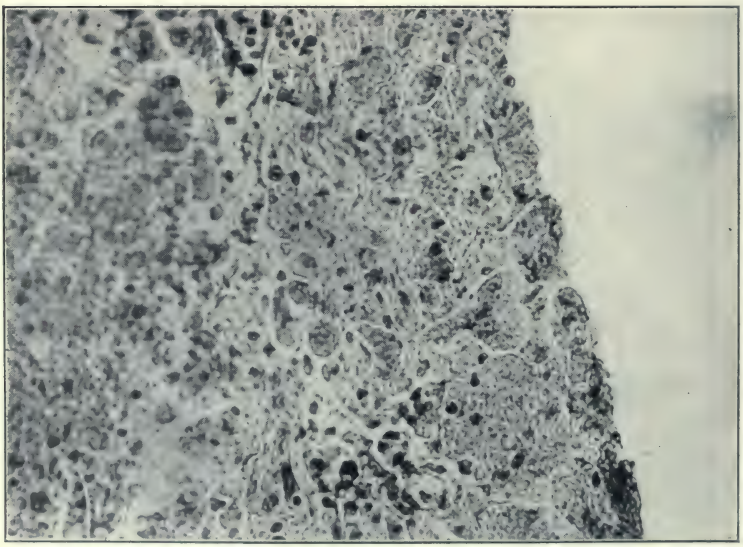

FIG. 4.—Wall of corpus nigrum cyst. Large pigment containing endothelial leukocytes.

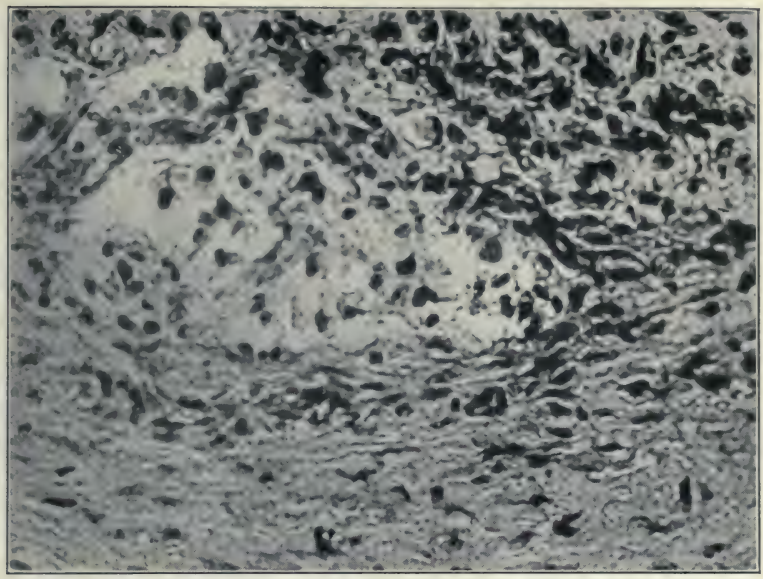

FIG. 5.—Vacuolized lutein cells with pycnotic nuclei. Hyaline fibrous tissue above, lutein cells with diminished cell protoplasm below.

THE "FOLLOW-UP" SYSTEM IN THE WOMAN'S HOSPITAL.*

BY

BYRON H. GOFF, M. D.,

Junior Attending Surgeon.

THE importance of an efficient "follow-up" system in the modern hospital is fully appreciated when the objects of such a procedure are considered. They are:

1. To follow up every ward patient after discharge from the hospital for a period of time sufficient to determine whether the treatment given has been permanently successful or not. Only from reports upon the facts obtained through such a procedure is it possible for a lay Board of Governors to learn of the character of the service rendered to the public by the institution for which they are responsible.

2. To provide means for the placing of responsibility for both successes and failures in treatment.

3. To afford opportunities for scientific studies of end-results.

The "follow-up" system used at the present time in the Woman's Hospital of New York is the result of considerable experience gained during the three years which have elapsed since the introduction of the "follow-up" idea. Every effort has been exerted to make it practical and simple.

The "follow-up" work in each case is begun before the patient is discharged from the hospital. On the day preceding the day of discharge, an examination is made by the attending surgeon who has assumed the responsibility for the treatment of the patient, and signed discharge notes on important points in the case, the convalescence, the condition of the patient upon discharge and the prognosis are recorded in the case history by him. Any instructions that may be considered necessary are given, and, finally, emphasis is laid upon the fact that the patient will be expected to return to the 'follow-up clinic" at intervals over a considerable period of time so that she may be kept under observation and advised until the final result of the treatment has been determined. An effort is made to make the patient realize the importance of such visits and to make her feel that the hospital's interest in her does not terminate with her departure from the ward.

* Published in the *American Journal of Obstetrics*, April, 1919.

NAME..... HISTORY NO.....

ADDRESS.....

PLEASE CALL AT THE OUT-PATIENT DEPARTMENT,
141 WEST 109TH STREET, AT 10 A. M.

ON.....

If you change your address, please send the new address to
the Record Department of the Woman's Hospital,
141 West 109th Street, New York, N. Y.

ALWAYS BRING THIS CARD

FIG. 1, *a*.—Card which patient keeps permanently and presents upon each visit to the Follow-up Clinic. (Size of card 3 × 5 inches.)

After the final examination, notification that the patient is a candidate for discharge is sent to the Social Service Department by the nurse in charge of the ward. Within two hours of such notification a worker from that Department, whose duties are

DATE OF NEXT VISIT

FIG. 1, *b*.—Reverse side of above card. Date of next visit is placed upon this side of card by Record Clerk.

confined to the "follow-up" work, visits the patient in the ward. The objects of this visit are:

1. To again impress the importance to the patient of the visits to the "follow-up clinic."

2. To arrange the date of the first visit to the "follow-up clinic" and to place same on the bedside card so that it may be referred to later by the Record Department.

3. To present the patient with a card (Fig. 1, *a* and *b*) upon which are written the name of the patient, the history number and the date of the first visit to the "follow-up clinic."

4. To inquire into the home conditions of the patient and to offer assistance where it is deemed necessary.

With such preliminary work properly carried out in the Hospital much has been done toward securing a satisfactory number of visits by the patient to the "follow-up clinic."

Upon the departure of the patient and the delivery of the case history with the bedside card to the Record Department, the record clerk in charge of the "follow-up" record work

1. Places the bedside card in an alphabetical file where it remains

Name Mrs. E. G.		Hospital No. 21256.
Address .. Faile Ave., Bronx.	Referred by Dr. J. S. E.	Admitted 4-25-18.
S M W Married five years.	Address .. E. .... St., Bronx.	Discharged 5-15-18.
Age 36.	Friend Mrs. E. B.	Operation 4-30-18.
	Address .. Faile Ave.,	Operator Dr. Bissell.
Chief Complaint: Hemorrhage from the uterus.		Anes., Gas and ether.

Preop. Diagnosis Myoma uteri.

Postop. Diagnosis Myoma uteri.

Path. Diagnosis Myoma uteri. Normal appendix.

Operation Supravaginal hysterectomy. Appendectomy—Prophylactic.

Important Points Normal ovaries were left in situ.

Convalescence Uneventful recovery. Patient discharged in good condition by Dr. Bissell.

FIG. 2, *a*.—Face side of Follow-up Abstract Card. (Size of card 7½ × 9½ inches.)

as a permanent card index to the history of the case and to the "follow-up abstract" of the corresponding number.

2. Abstracts the history on the face side of a follow-up abstract card (Fig. 2, *a*).

52058

RESULTS

5-3-18. Symptomatic and anatomic results satisfactory. To return in 3 months
Dr. Bissell.

8-29-18. Patient says that she is well. Anatomic result satisfactory. General physical condition much improved. To return in 3 months.
Dr. Bissell.

11-28-18. Symptomatic and anatomic results are satisfactory. The patient is in good health. To return in 3 months. Dr. Bissell.

FIG. 2, *b*.—Reverse side of Follow-up Abstract Card upon which are recorded Follow-up Notes.

WOMAN'S HOSPITAL IN THE STATE OF NEW YORK
MEMORANDUM CARD

Name Mrs. Ethel G. Hospital No. 21256

Address ... Faile Avenue, Bronx

Change of Address

Friend's Name Mrs. E. B.; Address ... Faile Ave.

Surgeon Dr. Bissell

Date of Operation 4/30/18 Date of Discharge 5/15/18

To Return for Examination 5/30/18. ✓ 8/29/18 ✓
11/22/18. ✓ 2/29/18. 3/15/18. S 4/4/18 ✓

.....

.....

FIG. 3.—Blank space after a date signifies that the patient has failed to return, a check mark that she has returned for examination and the letter S that the case has been placed in the hands of the Social Service Department.

3. Fills in a Memorandum Card (Fig. 3) which is used in recording the dates upon which the patient is due to return for examination. The date of the first return is taken from the bedside card.

4. Files the Memorandum Card in the Calendar File under the month and date upon which the patient is due to return for examination. The file contains a set of cards for each month in the year.

Four days before the date set for the first visit to the "follow-up clinic" the patient receives as a jog to her memory the following letter:

Dear Mrs.....

Will you kindly call at the Out Patient Department at ten o'clock in the morning on.....for examination?

Before you left the hospital we explained to you the importance of returning at intervals for observation so that we may give you any advice necessary in order that you may derive the utmost benefit from the hospital treatment.

You will be examined by the surgeon who operated upon you.

Very truly yours,

WOMAN'S HOSPITAL.

The same form is used to notify the patient four days before each subsequent visit.

There are held each week in the Out-patient Department at 10 A. M. four "follow-up clinics," one and the same day each week being assigned to the same attending surgeon who conducts the examination of patients personally. Patients operated upon or treated by him or his assistants are permitted to return only upon the day of the week assigned to him.

The first visit made by the patient to a "follow-up clinic" is set for a date approximately one month from the date of discharge. Subsequent visits are arranged according to the following rules:

1. Patients treated for malignant neoplasms are to remain under observation for a period of five years Four visits to the "follow-up clinic" will be made every year by all such patients.

2. Patients upon whom abdominal section has been performed will remain under observation for two years. Four visits will be made in the first year and two in the second.

3. Patients upon whom plastic operations have been performed are

to remain under observation for three years. Four visits will be made in the first year and two each year thereafter.

4. Patients upon whom minor operations have been performed are to remain under observation for a period of six months.

If the patient return for examination as requested, the attending surgeon dictates to the Record Clerk, who is present at each clinic, his findings which are recorded in short hand and later transferred to the reverse side of the "follow-up abstract" (Fig. 2, *b*). The date of the next visit is given by the surgeon to the Record Clerk who places it upon the reverse side of the card (Fig. 1, *b*) which is then returned to the patient. At the same time the Record Clerk places the date of the next visit upon the Memorandum Card wh ch is later filed under that date in the Calendar File.

If, however, the patient fails to return for examination, the Memorandum Card is filed ahead two weeks n the Calendar File and a second form-letter requesting the patient to return on that date is mailed four days previously. Should she then fail to appear, the Memorandum Card is removed from the Calendar File and placed in the Social Service File—an alphabetical file—where it remains until the patient has been interviewed in her home by the Social Service Worker and a promise has been secured for a visit to the "follow-up clinic." The Memorandum Card is again placed in the Calendar File under the date upon which the patient has promised to return, and the usual letter is sent as a reminder four days before that date. Should the patient then fail to return, a second visit is made by the Social Service Department to induce her to do so. If failure is finally met, the Memorandum Card is placed in the Delinquent File—an alphabetical file—where it remains for one year after which it is destroyed, if the patient has not appeared in the meantime. Note of the failure of the patient to return is made upon the Abstract wh ch remains in its place in the Numerical File as a permanent record.

At times patients who do not live in Greater New York find it impossible to return for examination. In such a case, a personal letter is written by the Record Clerk in an attempt to learn whether the result has been satisfactory to the patient. The reply is recorded on the "follow-up abstract."

During the year beginning October 1, 1917, and ending September 30, 1918, eleven hundred sixty-one (1161) "follow-up abstracts" were made out for patients treated in the free wards of the Woman's Hospital Of that number 62 per cent. have responded promptly and satisfactorily to requests for visits to the "follow-up clinics,"

20 per cent. have responded in a partially satisfactory manner and 18 per cent. have refused to return for examination. Of the 20 per cent. responding in a partially satisfactory way, a large majority returned a sufficient number of times so that certain conclusions could be drawn in regard to the success or failure of the treatment. The results for the first quarter of the present year show an improvement over the above, due to the facts that the "follow-up clinics" are now personally conducted by the Attending Surgeons, and each patient is assured of an examination upon each visit to the clinic by the surgeon who treated her while in the hospital.

A feature of the "follow-up work" which is worthy of special mention is the monthly report by each Attending Surgeon before the Staff Conferences, which are held weekly, upon the "follow up" cases examined during the preceding month by him. The cases are classified in such reports, into successes, partial successes and failures. The numbers in each class are stated and the failures and partial successes are reported in detail. Discussion by the staff follows in order that the cause of the undesirable result may be determined. Obviously such reports are a source of much valuable information to the entire staff.

END-RESULTS OF RESECTION OF FALLOPIAN TUBES.*

BY

EDWARD ARTHUR BULLARD, M. D., F. A. C. S.,

Junior Attending Surgeon.

In the literature of the eighties and nineties of the last century we find the surgical treatment of pelvic infections very radical. Hysterectomy with removal of both ovaries and both tubes was a usual procedure in the presence of infection of the internal generative organs. But while this radical method was most efficient in cleaning out the infected pelvis, in stopping the dysmenorrhea, the chronic pains and the many other symptoms that so frequently amounted to invalidism, it trailed in its wake two most undesirable sequels—permanent sterility and surgical menopause. As experience accumulated the profession realized that this premature menopause was as great a disturbance to health and as intractable to treatment as the pelvic infection had been, and that by complete ablation of the uterus and adnexa a patient often had merely exexchanged one group of symptoms for another group equally distressing. And so here and there in meetings and medical papers protesting voices were heard with the result that operators began to save ovaries where possible. These same conservatives also suggested leaving the uterus in and repairing the tubes, often reluctantly, but the outcry of the women against hopeless sterility demanded consideration. The continued efficiency of the smallest remnant of a resected ovary has been demonstrated innumerable times. Upon the subject of conservative surgery of the ovaries I do not wish to take your time. I would, however, present to you the old problem of plastic surgery of the tubes, referring to the best known published reports of successful cases and adding a résumé of forty-four cases done at the Woman's Hospital since 1907.

In 1891 August Martin reported twenty-four cases of conservative surgery of the adnexæ. This seems to be the earliest good work recorded. One of these cases had complete removal of one appendage and a resection of a hydrosalpinx on the other side. Eighteen months later she aborted in her third month. Four years later Martin referred in his text-book to sixty-five cases of conservative

*Read before the Brooklyn Gynecological Society, April 4, 1919. Published in the *American Journal of Obstetrics*, May, 1919.

adnexal surgery and stated that two of these women had become pregnant through repaired tubes. He also mentioned that Mackenrodt had had two such cases.

In this country Polk was one of the earlier advocates of greater conservatism, his papers on the subject appearing as early as 1891. In 1894 he drew the attention of the American Gynecological Society to the fact that members of that body, MacMonagle, Baer and others, had reported to him six cases which had become pregnant through repaired tubes. He recorded three cases from his own practice.

In 1895 Chavin reported a case operated on by Delbet, ablation of one appendage and salpingostomy on the other side, who became pregnant twice during the following five years. In the same year Gersuny after removing one appendage entirely, found a hydrosalpinx on the other side. He opened this and stitched the ovary into it. Seven months later the woman became pregnant.

Montana in his Paris Thesis of 1899 cited a case of pelvic inflammation operated on by Legueu in 1896—a double salpingostomy with suture of each tube to its ovary—followed by normal labor four years later.

Palmer Dudley was an enthusiastic advocate of conservatism, and though in 1903 he had a list of forty-three women who had become pregnant after plastic conservative operations on tubes or ovaries, only two of this number gave proof of having become pregnant through repaired tubes. In one case, he "slit them up (the tubes), washed them out and put them back" to quote his own words. In the other case he removed one tube entirely and resected the other.

In the same year of the publication of Dudley's brilliant paper Ferguson put on record a case that became pregnant six months after a salpingostomy. Bonifield had a similar case.

In 1907 John Van Doren Young cited an interesting case who, after having both tubes amputated in their middle thirds, had one baby and one miscarriage during the following three years, and finally about four years after the operation had to be opened for ectopic in one of these stumps.

Turck reported the delivery of a woman upon whom he had done salpingostomy with attachment of the ovaries to the tubes end three years previously.

Kehrer in 1909 and L. C. Morris in 1910 each reported a pregnancy following a salpingostomy, and Goffe had the same good fortune in two instances.

In 1910 Polak reported three remarkable cases. The first had both tubes removed three years apart but in spite of this became

pregnant immediately after the second salpingectomy. The technic of the last salpingectomy was not stated. The second case had an interstitial pregnancy with rupture following three months after the tube of that side had been excised into its cornu. In the third case an interstitial pregnancy ruptured some time after both tubes had been removed.

Hardly less remarkable because of the age of the patient and the duration of the infection is a case reported by Child in 1910. Forty years old, married three years, sterile. Almost constant pelvic pains for fifteen years, unrelieved by treatment. Dr. Child curetted, and on opening the abdomen the ends of both tubes were freed from adhesions, well dilated, probe passed showing tubes open into uterus. Nothing more done to tubes. Four months later patient conceived and went to term. Another case had two babies following a salpingectomy on one side and a salpingostomy on the other.

Stone removed one appendage entirely for a gonorrheal salpingitis and irrigated the other tube with 1:1000 solution of bichloride forced through into the uterus. Pregnancies followed nine and eleven years later.

In 1916 Salatich after removing one appendage for tubal pregnancy did a salpingostomy on a hydrosalpinx of the opposite side and has been rewarded by two normal pregnancies.

At the meeting of the New York Obstetrical Society in 1916, Vineberg reported a case from whom he removed one adnexa and simply freed the end of the other tube of adhesions. She was found pregnant eight months later.

In the discussion that followed, West reported three cases of pregnancy in each of whom both tubes had been resected. In Oastler's experience only two pregnancies had followed about 200 cases of conservative operations on the tubes.

The literature of the past thirty years approximately covering the period during which surgeons have been doing plastic work on the Fallopian tubes, contains a very scanty number of cases of pregnancy proven to have occurred through repaired tubes. In sifting out my case reports I have been careful to accept only those that would stand the acid test, so to speak. That is, I made certain that the pregnancy *must* have occurred through a tube which showed proof of a previous inflammation and which had had some form of reparative operation done upon it. A few cases are included whose tubes were simply freed or opened.

Curious to learn more of the present-day results of resected tubes as to later pregnancy I sent out letters to all patients who had had any form of tubal resection done in the Woman's Hospital during

the past twelve years. Of the 145 cases done there, among which were thirty personal ones, I was able to get full reports from only forty-four. Twenty-one of these have been entirely relieved of symptoms; twenty have been total failures or only partially successful; and only three have become pregnant.

The three successful cases are as follows:

CASE I.—Aged thirty-four. Operation by Dr. Austin Flint, March 18, 1913. Adhesions freed about tubes and ovaries. Ends of tubes opened by manipulation, contained small amount of serum. Washed out tube ends with saline and dropped them back without further treatment. Gilliam operation then done. Dr. Flint did not know the nature of the original infection, that is, whether it was gonorrheal or of other type, but the fact that manipulation was all that was necessary to open the ends of the tubes makes it probable that the infection had not been very destructive. He personally reported to me that this patient has had two babies since operation.

CASE II.—Aged twenty-three. Two years ago had an accidental miscarriage attended by fever and chills and was ill abed three weeks. Denied venereal disease. Since miscarriage frequent pelvic pains, constant leukorrhea, profuse irregular menses. Operation April 10, 1917, Dr. Reginald Rawls. Tubes and ovaries found inflamed and adherent. Both ovaries resected and salpingostomy done on both tubes. The pathological laboratory reported, "tubes greatly thickened, tortuous, kinked and covered with adhesions. Lumen dilated and containing pus. Microscopical diagnosis: chronic purulent salpingitis." After operation patient examined about every two months in the Out-Patient Department. Up to October, 1917 (over five months) there was adnexal thickening and tenderness with complaints of bilateral pains, but at the last examination patient was much improved. In October, 1918, she presented herself giving clearly the following history: No menses from May to early September, 1918, but almost constant nausea during that time. Early in September profuse uterine bleeding came on with passage of large clots and accompanied by severe pelvic cramps. This lasted fifteen days. This history is typical of miscarriage and I have thought it fair to include this case as one that had become pregnant through resected tubes. The fact that the laboratory had found *actual* pus in these tubes makes the subsequent pregnancy even more remarkable, even though the history suggests that the original infection was probably not Neisserian.

CASE III.—Aged twenty-six. Private patient of Dr. I. B. Terry, who tells me she had induced abortion on herself several times prior to operation. Operation January 10, 1918, for diagnosis of ruptured ectopic. Uterus bound over to the left side by adhesions. Blood clots about the pelvis. Left tube contained an ectopic at distal end. It was resected and salpingostomy done in the middle third. The other tube was adherent and clubbed at the end. About an inch of this was amputated and salpingostomy done. A small

pedunculated fibroid was removed and the uterus suspended. Six months later Dr. Terry attended her for a four months miscarriage. Here again we have probably an infection of the more favorable type, *i.e.*, probably originating postabortive and likely not gonorrheal.

Though the forty-four cases of my series were done by fifteen operators the technic was usually the ordinary one for a salpingostomy. In a few of my own the stump was so short and the tube lumen so tiny I probed gently to be sure of its patency and did not suture. As far as I could find out no cases were treated by the technic sometimes used by Ward, Child, Oastler and others by which strands of catgut or kangaroo tendon are passed into the tubal stump and left in place in the hope of thus aiding permanent patency.

Many were examined by me personally postoperative; some of the reports were given me after examinations by other men on the visiting staff and a few patients have reported by letter.

Let us pause a moment for a brief scrutiny of the list of twenty cases that have been labeled partial or complete failures. Eight of this group must be fairly called flat failures, for four of them had definitely worse symptoms than before operation while the other four were unimproved. The remaining twelve of these twenty unsatisfactory cases have been improved in one way or another, but are not entirely relieved of symptoms, varying degrees of pelvic pain, dysmenorrhea, etc., being still present.

There is nothing new in this paper except that the cases studied bring out the following facts that have not been sufficiently emphasized in most other papers on this subject. Practically half of these cases (twenty out of forty-four) had pain in these resected stumps, continued dysmenorrhea or other symptoms. A serious major operation had done them little or no good. In other words, if one might presume to draw any conclusions from a group of only forty-four cases they would have to be in this instance virtually these. In only 5 per cent. of this series has salpingostomy achieved its end, that is, later pregnancy; and for the sake of the chance of pregnancy approximately half these women have continued to suffer more or less pelvic distress.

In 1911 Gellhorn wrote an admirable paper on salpingostomy in which he quoted Reynolds and J. G. Clark as holding opinions similar to his own, namely, that pregnancy rarely followed the operation. Clark was rather antagonistic toward it, considering it justifiable only in old hydrosalpinx. Gellhorn thought it useless to do on any tube that had been gonorrheal, for the spermatozoa would rarely get by the gonorrheal endometrium and he thought Neisserian infection pretty sure to destroy the cilia in the tubes. He felt that streptococci and staphylococci were less destructive, but in any case where there was pus or even a distended hydrosalpinx he would feel hopeless. He was more optimistic if the adhesions were from an ectopic or secondary to an appendicitis. Gellhorn's opinions are here cited in detail because eight years

later after a considerable search of the literature dating back to the origin of the operation in 1885, and the study of this Woman's Hospital series, I am forced to come to essentially the same conclusions. I cannot agree with him and with Reynolds, that the operation has no ill results. As previously stated, our series had barley 50 per cent. who had subsequent trouble with the tubal stumps, and Polak, Young and others have reported interstitial and tubal pregnancies.

Jack wrote a paper in 1917 urging more optimism and conservatism in this work and contributing a special probe-pointed scissors to our technic.

Perhaps the most enthusiastic champion of conservative tubal surgery is Child, who in 1910 said, "Upon restoring the patency of the tubes either by separating adhesions or resecting the obliterated portion, it is not unusual for conception to promptly occur as instanced by the following case" (previously mentioned in this paper).

It seems to me that Polak's terse statement made in 1911 has still but few exceptions. He said, "End-results of salpingostomy are unsatisfactory. . . . Resection and phimosis operations are followed by useless, painful and occluded tubal ostia."

Tubal resections had better be limited to those women particularly anxious to have children.

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A NEW FORM OF SURGICAL KNOT.*

BY

HERMANN GRAD, M. D., F. A. C. S.,

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(With one illustration.)

THE purpose of this contrivance is to obtain a secure ligature at all times, a ligature that will not slip, one that will hold the tissues in its grasp, with a firm grip.

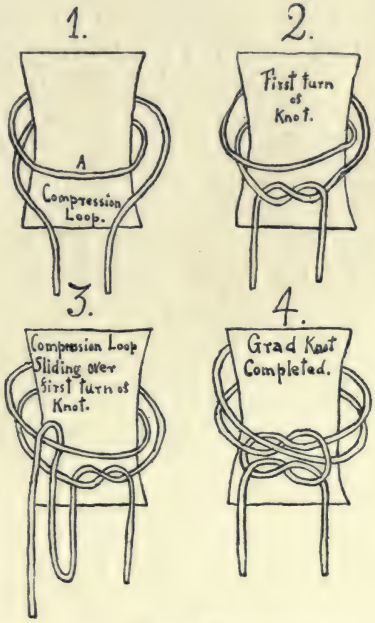
When a surgeon places a ligature about a bleeding vessel or vessels, he wants it to do two things. First the ligature should not yield in its power of compression and second it should not slip off the pedicle. The integrity of a ligature depends upon its knot. Analyzing the component parts of a knot we find it consists of two turns of the string. The integrity of the surgeon's ligature will depend upon the firmness with which the first turns of the knot compresses the tissues by its grasp. The second turn of the knot merely holds permanently the first turn. It is very plain that if the resistance in the tissues in the grasp of the ligature is great, the first turn of the knot will yield, unless it is prevented from doing this by compression, until the second turn of the knot is carried home. It is customary to hold the first turn of the knot with thumb forces until the second turn is completed. In this manner a secure knot is obtained. With the knot herewith described the first turn of the knot is prevented from slipping in an automatic way. The mechanism of the knot is shown in the accompanying four figures, which sufficiently explain themselves. Fig. 1 shows a loop which compressses the first turn of the knot automatically. This compression loop "A" is the distinctive feature. As the free ends of the ligature are pulled taut, loop "A" falls into place and hugs the first turn of the knot. The greater the tension on the free ends of the ligature, the firmer is the grasp of the compression loop on the first turn of the knot. The second turn of the knot is now carried home at leisure. A knot is thus obtained which cannot slip or give up the desired compression of tissue in the grasp of the ligature.

The knot depicted by these figures is an original knot. It is a surprise to me that no one has stumbled upon it before this.

* Published in the *American Journal of Obstetrics*, March, 1919.

I have investigated the matter carefully and have not been able to find this procedure previously published. Therefore in all modesty I claim originality for the knot.

The knot was originated many years ago, after witnessing fatal secondary hemorrhage after ovariotomy, the ligature having slipped off the ovarian artery. The patient was a young woman, operated upon for the removal of a dermoid cyst, and was put to bed in good condition. An hour later she was pulseless and was hurried back to the operating room. The abdomen was reopened, the bleeding point tied, but it was too late. The knot that had



Showing manner of tying the compression knot.

slipped off the pedicle was found in a clot and a careful examination showed it to be a good substantial knot. What had happened in this fatal case was that the first turn of the knot was insecure and slipped. Analyzing the steps of forming a knot, led me to the invention of the knot proposed. It is impossible for it to slip, because the first turn of the knot is secure and the security of it is maintained in an automatic way by the compression loop, until the second turn of the knot is carried home.

This knot is very readily applied. All one has to remember is to create a compression loop. This loop is the essential fea-

ture of the knot. It makes no difference in what manner this compression loop is obtained, whether with a needle, ligature carrier, or otherwise. Wih a ligature carrier the compression loop can be created with one sweep of the instrument. In places not so accessible a needle may be used and a compression loop created with two stabs of the needle. Having created the compression loop, the first turn of the knot is made. The next step is to carry one of the free ends of the ligature under the compression loop, and the free end of the ligature, which is to pass under the compression loop, is determined in the following way: If the first turn of the knot is a right-handed one, the free end of the ligature on the left-hand side is passed under the compression loop. If the knot is a left-handed one, the free end of the ligature on the right side is passed under the compression loop. The first turn of the knot is now tightened, and as the ligature is made taut the compression loop holds the knot automatically and prevents it from relaxing until the second turn of the knot is carried home and the knot is completed. It is very necessary to pass the proper free end of the ligature under the compression loop, as outlined above. Unless this is complied with, the compression loop will fail to act correctly. If the incorrect free end of the ligature is passed under the compression loop, the first turn of the knot does not become compressed and an insecure ligature is the result. Fig. 4 shows the correct position of the compression loop. It passes across the first turn of the knot and must necessarily compress it firmly, and holds it until the second turn completes the knot.

THE VISITATIONS OF INFLUENZA AND ITS INFLUENCE UPON GYNECOLOGIC AND OBSTETRIC CONDITIONS.*

BY

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Junior Attending Surgeon.

THE uncertain and fragmentary character of the oldest medical chronicles does not permit the absolute identification of influenza with the "Epidemical Diseases" of Hippocrates or with the "Plague of Athens" described by Thucydides, nevertheless, many historians believe them to be one and the same disease.

From the 6th to the 10th century, influenza was probably endemic in Italy, but it is not until the 12th century that the chronicles clearly record the epidemic character. In the year 1173 the records of France, Germany, and Italy mention the presence of a disease, evidently epidemic if one may judge from the ecclesiastical manuscripts which state: "In these days the whole world was infected by a nebulous corruption of the air causing catarrh of the stomach and a general cough, to the detriment of all and the death of many." Under this same year (1173) the chronicler of Melrose Abbey enters: "A certain evil and unheard of cough which affected every one far and near and cut off many." In the medieval Latin chronicles, the word "tussis," or cough, is usually used, the name "influenza" not having been given to the disease until about the 18th century. Prior to this time we find numerous terms, some of them more or less fanciful, to describe the symptoms of the disease; others derived from the name of the country whence it was supposed to have come. In early Gaelic manuscripts a disease is mentioned the symptoms of which answer to those of influenza and which was called "Creatan" probably from "Creat," meaning chest; and in the "Annales of the Four Masters" mention is made of an epidemic of the disease in Ireland in 1328, called "Feucht" or "Slædan."

In France, under Charles the Sixth, in 1414, is an account by Pasquier which leaves no doubt the disease described is influenza, then called "Ladendo." This is the first known description, and

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allusion was also made to the influence of the disease upon the puerperal state, and the menorrhagia which resulted.

A few years later (1427), a St. Albans chronicler of Canterbury Abbey recorded: "In the beginning of October a certain rheumy infirmity, which is called "Mure" (at this date used to describe universal influenza, later, a cold) invaded the whole people and so infected the aged along with the younger that it conducted a great number to the grave." About this same time (1430) an epidemic occurred in Scotland which was probably influenza but was called "Pestilentia Volatilis."

In 1510 a wave of influenza swept from the south to the North of Europe, from Malta, Sicily, Spain, Portugal, Italy to Germany, Holland, France, and England. It was described under various names, viz., "Catarrhus Epidemica" or "Febris Catarrhalis Epidemica." No name was distinctive, but perhaps the most common was "ague," the term ague meaning simply acute, the adjective of "febris acuta" having been made into a substantive.

The universal description of this fever, its suddenness, simultaneity, universality, prostration, and for some time a violent paroxysmal cough, leaves no doubt of the character of the disease in this epidemic. In 1557–1558 occurred the historical great wave of influenza now known as "The Strange Sickness," "The New Sickness," "The New Acquaintance," "Shafhusten," "The Sweating Fever" or "The Posting Sweat," from the rapidity with which it invaded England, or simply as "The Sweat." This latter seems to have been a common name for the sickness in Shakespeare's time, for in "Measure for Measure," the Bard says: "What with the War, what with the sweat, what with the gallows, and what with poverty, I am custom-shrunk. How now? What's the news with you?"

The next undoubted influenza (1580) was pandemic, traveling from the Oreint to Constantinople and North Africa, invading Europe, and extending to the British Isles. It was described as an "Epidemic Catarrhous, Semi-pestilential Fever." On the continent it was frequently termed "Sudor Anglicus" or "English Sickness." In Italy it was called the "Coccolucio," meaning cap, from the almost pathognomonic symptoms of distressing pain and sense of constriction in the forehead or temples, reminding one of the "fierro chuto" or iron cap in the "Catarrho Maligno" of the South American epidemic (1719). In England it was known as the "Gentle Correction." In the epidemic of 1675, Sydenham called the illness "Tussis Epidemica," to describe the cough which was prevalent without fever.

The contagious nature of the disease began now to receive more attention. In Germany it was described as a "Contagiosis Katahrr-fieber," and Calenus writes: "Especially are those prone to this sickness who converse much in society, while those of a more studious nature who lead a secluded life are less likely to be affected."

The first half of the 17th century was a period free from influenza in Europe, but marks its entrance into North America (1647), adding another hardship to those already endured by the early settlers of this country.

In the 18th century occurred seven epidemics. In the year 1780 the remarkable pandemic which, encircled the globe, carrying the disease into quarters of the earth previously known to be free from the disease. It originated in the fall of 1779 in China and India; in December entered Siberia and Russia; in February, Sweden and Denmark; and in the early spring Europe and the British Isles. In the fall of 1880 it had reached the western Hemisphere and continued to South America. It was known simultaneously in different countries as Chinese, Russian, Spanish, Italian, etc., according to the country from which it made its entrance, and was also called "La Petite Poste," Le Petit Courtier," "Tac," "Galanterie," "Mode Krankheit," "Blitz Katarrh," "The Blue Plague," "Grippe," from Agripper or Angreifen, to take hold, or from the name of an insect popularly supposed to be the cause of the disease.

The term influenza came now into general use, and in 1782 was formally adopted by the College of Physicians in London. It is Italian in origin and usually considered to signify the influence of the stars upon the disease, but the original etymology was probably different. The word "influxio" is the correct classical term for a humor, catarrh, or defluxion, and "influsso" is the Italian form. It was in 1743 that the Italian name was first brought into use in England during the epidemic in Rome, and after the epidemic of 1762 in England it was generally used to describe the disease.

The 19th century was marked by several epidemics in Europe and four in the Western Hemisphere, and by three pandemics, viz., 1830–1833, 1847–1848, and the years 1889–1890, all three of which had the same course from Asia to Russia and Europe, and then to the Western Hemisphere. The type of influenza of 1889 differed somewhat from previous invasions in that while catarrhal symptoms were present, the prostration and ensuing weakness were the most marked symptoms; but the chief characteristic of this epidemic, which made it unique in the long history of invasions was the recurrence of the epidemic in three successive seasons (for the period 1889–1894).

The present epidemic of the 20th century, while yet unwritten, has contributed a name to history—"Flu," descriptive not only of the disease but its power of mobility.

Etiology.—Not the least interesting in the history of influenza are the theories which from time to time have been brought forward to explain this illusive, universal disease which sweeps in waves over the earth at intervals, now of a few years, now of a century; sometimes in midsummer, again in midwinter; unmodified by civilization or sanitation. The descriptions of the disease in the medieval chronicles are as true a picture of influenza as those seen in the writings of to-day. The cause of the disease was sought in something as phenomenal as the disease itself, something telluric or cosmic. Accepting the Hippocratic doctrine of "epidemic constitutions," the mysterious something that set astir the epidemic wave was looked for in the air, in the variations of the atmosphere, upon the alterations of drought and moisture in the earth, in effluvia from the soil, emanations from animals, in earthquakes, volcanic eruptions, comets, and the relations of astral bodies.

In closing the historical sketch of influenza, it may be of interest to call attention to a remarkable theory of modern times, as expounded by Noah Webster, the lexicographer of this country, who, while a journalist in New York, wrote a history of "Epidemic and Pestilential Diseases." He says: "It seems probable to me that neither season, earthquakes, nor volcanic eruptions are the causes of the principal derangements we behold in animal and vegetable life, but are themselves the *effects* of those motions and invisible operations which affect mankind. Hence catarrh and other epidemics often appear *before* the visible phenomena of eruptions and earthquakes, and influenza is the effect of some excess of stimulant powers to the atmosphere by means of the electrical principle; for no other principle in creation which has yet come under the cognizance of the human mind seems adequate to the same effects."

GYNECOLOGIC AND OBSTETRIC CONDITIONS.

As we turn to Hippocrates to find the first treatise upon "Epidemical Diseases," so we may turn to him to learn the influence of influenza upon the genital tract in women. As it tallies so well with the experience of obstetricians in the epidemics of the 19th century, I will quote the statement in full.

"Many women were taken ill, but less than the men, and dy'd less. Many of 'em had hard labors and after the birth were taken

ill again, and for the most part dy'd. A great many had their menses come down in their fevers, others bled at the nose and many young girls had the first appearence of their menses then . . . All of my acquaintance miscarried that chanced to be with child."

In considering gynecologic conditions, I will speak first of:

1. Cases with previously normal menstruation.

The influence of a severe attack of influenza upon menstruation is to markedly increase the flow if the onset of the disease coincides with the regular time of the menstrual period. The consensus of opinion is that menstruation does not render the individual more susceptible to influenza, but if the disease occurs it will often call back a menstruation after a normal period has ended several days before, or it will bring on a period before its time. In either case the flow lasts longer and is much more profuse than normally. The bleeding is hard to check and frequently lasts until the influenza symptoms subside. That it is a true menorrhagia and not a metrorrhagia is seen by the fact that the next menstrual period does not occur until four weeks later.

Müller and Gottschalk found the cervix and corpus uteri soft and swollen during influenza. The cavities of the uteri, as proved by measurement with a uterine sound were increased in depth and in consistency felt like pregnant uteri. They were tender on both palpation and movement.

Often girls of ten or twelve years had their first period during an attack of influenza (Mynlieff, Felkin, Engel). Several instances are recorded of uterine bleeding after the menopause had long been passed (Leichternsten), and Engel reports three cases of amenorrhea cured by influenza, the menstruation being established first after an attack of influenza and continued normally thereafter.

Müller saw 48 cases of influenza and menstrual anomalies in.....	46
Felkin saw 100 cases of influenza and menstrual anomalies in.....	60
Engel saw 902 cases of influenza and menstrual anomalies in.....	265

2. Cases with known pathological lesions.

The tendency of chronic uterine or pelvic disease is to almost certain acute exacerbation of local infection (Ameiss, Müller, Stoltz, Kroenig). Inflammations are usually made worse by the influence of influenza, and tumors, both benign and malignant, increase rapidly in size (Stoltz and Leclerc).

According to Mynlieff, Gottschalk, and others, the cause of uterine bleeding is an acute infection of the mucous membrane of the uterus, as in other infectious diseases—viz., cholera, smallpox,

typhus, and typhoid—as a result (1) of the intoxication of the blood; or (2) due to a reflex vasomotor disturbance of the uterus by infection in the respiratory or gastrointestinal tract; or (3) the bacillus itself causes an acute hemorrhagic endometritis.

In women the course of influenza is milder and convalescence is shorter, its influence being less upon the respiratory and gastrointestinal tract and greater upon the genital. It would seem that the uterine mucosa has an especial predisposition for the localization of this disease, due either to the pathological structure of the mucous membrane or to the conditions associated with it.

Taking up next, the obstetrical conditions, again the question of susceptibility arises, but pregnancy does not seem to make the individual more susceptible to influenza. In light attacks influenza has no effect upon mother or child (Jacquemier, Möller), but in severe cases it has a very grave influence upon both, and *vice versa*, pregnancy seems to exert an unfavorable influence upon the course of influenza.

For the sake of convenience, I will consider puerperal conditions.

First.—In the early months of pregnancy.

Abortion is likely to occur at any period of gestation, but more especially in the earliest months as the ovum is then more readily cast off, as shown in the following table.

Author:		Cases	Aborted or premature delivery
1. Bar et Boulle		50	16
2. Amann		16	6
3. Möller		21	11
4. Chaletain	before 7 months	26	4
	after 7 months	12	6
5. Recau	before 7 months	28	5
	after 7 months	15	7
6. Collis		27	7
7. Fischel		21	3
8. Mattous		20	3
9. Müller		21	7
Total		257	75

That is, every third or fourth case of pregnancy aborted or had a premature delivery.

The expulsion of the ovum may be caused by the mechanical force exerted upon the uterus in coughing or, as Stoltz believes, by infection in the endometrium and hemorrhage into the ovum. This

theory would be substantiated by the unusual friability of the ovum aborted during influenza.

Second.—In the later months of pregnancy.

Premature delivery when gestation is at or near term becomes a very grave complication of influenza, from the size of the fetus and the tendency to uterine hemorrhage. Death of the fetus in utero often occurs (Amann, Hintze), but whether this is due to a toxic influence upon the mucous membrane of the uterus, or directly upon the fetus; or whether the influenza infection may not in certain cases begin in the genitalia—as in a case of Thaler and Zuchermann—it is not possible to say. Numerous instances of mild symptoms of influenza have been reported in the newly born; and postmortem (Vinay) has shown the trachei and bronchi are injected, the lung tissue edematous, and the parenchyma in a state of atelectasis.

In severe cases of influenza with capillary bronchitis, dyspnea, cyanosis, or pneumonia, pregnancy may cause unfavorable influence by mechanical pressure upon the chest wall, and upon an already overburdened heart, but emptying the uterus does not better the condition (Kermauner). Placental bleeding is excessive at such a time, and the uterus fails to contract. Usually in pregnancy cases complicated by heart or kidney disease, the condition is improved by delivery; but in infectious diseases this is not true, and the same seems to hold in influenza. In pregnancy there is a lowered resistance to general sepsis and the site of the placenta is a favorable terrain for a secondary localization of the general infection or an endometritis due to the pneumococcus.

Third.—Influenza during labor.

If the disease develops in the course of or shortly before labor, the pains may be excessive but are lacking in force, labor is tedious, and atony of the muscle results (Möller). The lochia is bloody and profuse for a longer period than usual, and involution is slow (Amann Hintze, Engel).

Fourth.—Influenza during the puerperium.

The chances of a severe course of the disease and general infection are much greater in the lying-in period, as the uterine mucosa furnishes favorable ground for the infection. If the disease does not occur until the puerperium it may be difficult to diagnose from puerperal sepsis, but throat and chest symptoms associated with pain in limbs, back, and head are almost pathognomonic (Ameiss), while the high temperature but lower pulse rate may aid the differential diagnosis. The puerperium is longer, as subinvolution

is slower, and bleeding often continues for the duration of the influenza symptoms.

CONCLUSIONS.

1. Mild attacks of influenza have no influence upon gynecologic or obstetric conditions.

2. Severe attacks of influenza produce menorrhagia and exacerbation of chronic gynecologic conditions.

3. Severe attacks often cause abortion, premature delivery, or stillbirth.

4. Labor is prolonged and tedious.

5. Pregnancy has an unfavorable influence upon the course of a bronchitis or pneumonia in influenza.

6. Induction of labor has no beneficial effect upon the course of influenza.

7. The chances of general infection are greater if influenza occurs during the puerperium.

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RENAL COMPLICATIONS OF PREGNANCY FROM THE STANDPOINT OF THE UROLOGIST.*

BY

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THE important rôle played by the kidneys during pregnancy has long been a matter of serious thought. Recent investigations of metabolism and kidney function have broadened the general knowledge of this subject, but very little has been added by the urologist. The more careful study of pregnancy by the urologist in association with the obstetrician should lead to a diminution in the incidence of renal complications and a more rapid recovery, with less serious sequelæ when lesions are found to exist.

The patients whom I have seen during pregnancy have all presented well-developed complications, only then recognized. In these cases, one fact has appealed to me, namely, that too little attention is given to the individual woman when she first presents herself to the obstetrician. This fact holds good for private patients, who usually come for examination early in pregnancy, as well as for hospital patients, who present themselves late in term or when in labor. Less may be accomplished with the latter than with the former class. The environment, habits of life regarding exercise, eating, drinking, and the condition of the gastrointestinal tract all receive little consideration. A complete examination, including the mouth, teeth, tonsils, accessory sinuses, chest and abdomen; careful palpation of the kidney and other viscera, coming lastly to the pelvic organs, should be made but seldom has been made. Often there has been a single analysis of a voided specimen. A chemical and bacteriologic examination of a catheterized specimen of urine, and, if the patient presents any urinary symptoms, a complete urologic examination should be but has not been made. The taking of pelvic measurements, the palpation of the uterus and adnexa, the examination of a voided specimen, and a few words of advice, will not

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go far toward anticipating and preventing renal complications of pregnancy.

The renal function is such an important factor during pregnancy that it is right to look on the pregnant woman in one sense as a urologic case. This is true to the extent of warding off complications by advice as to the proper management of the case, and actual participation in and continued observation of those presenting renal complications.

ETIOLOGY.

Why are the kidneys particularly susceptible to lesions during pregnancy?

1. Being organs of elimination, they are called on to eliminate the toxins of the fetus as well as of the mother.

2. The skin is less active than normal, rendering little assistance.

3. The diminished activity of the woman leads to less activity in the organs of metabolism, poor digestion and sluggishness of the bowels, thus increasing the amount of toxic material thrown on the kidneys to eliminate.

4. The increase of toxic products passing through the kidney causes kidney irritation, which leads to congestion, thus producing an important predisposing factor to infections.

5. The lowered resistance of the patient allows focal infections to become more active.

6. Coexistent with the foregoing, more bacteria are thrown into the blood stream, and the kidneys, already congested, are fertile soil for infection.

7. Intraabdominal pressure mechanically interferes with the normal function of the abdominal viscera.

8. When a preëxisting kidney lesion is added, such as a renal or ureteral anomaly, renal tumor, or malposition of the kidneys, a chronic infection, chronic nephritis, or a calculus, as well as ureteral lesion interfering with drainage, the urologic aspect of the case becomes most important. Should not the kidneys be relieved of the load so far as possible? How may this be accomplished without a complete examination of the patient and attention to all details of bodily activity?

Recent investigations have given evidence to show that a large percentage of renal infections are hematogenous in origin. A case recently observed clearly demonstrated this point. The woman, seen during her eighth month of pregnancy, was septic. I was asked to see her because of the diminished urinary output, and the pres-

ence of large numbers of streptococci and colon bacilli in the urine. Blood cultures showed the same organisms. She died of general sepsis. At necropsy, conducted by Dr. Losee, of the Lying-In Hospital, multiple miliary abscesses were found in the substance of each kidney, sections of which showed the same organisms, while the kidney pelves presented no lesions.

While the transmission of infection from the colon or the bladder to the kidney by lymphatic extension or directly to the ureter from a diseased appendix or a broad ligament infiltration or along the ureteral mucosa when there is a deficient vesico-ureteral valve, is possible and probably does occur, these cases are rare.

The most important element, next to the supply of bacteria to the kidney, is a lowered kidney resistance from the causes already enumerated, or interference with kidney drainage. Pressure on the ureter from the fetus has been given as an important factor in this connection. The ureters, particularly the right, have been found dilated and filled with urine in about two-thirds of the gravidæ coming to necropsy. This has been attributed to torsion, stretching or kinking of the ureters due to the enlargement and dislocation of the pelvic organs, but not to compression, since the specific gravity of the pregnant uterus is said to be equal to that of the intestinal mass. The pressure in the pelvis of the kidney is only 10 mm. of mercury, so that slight causes may lead to the stopping of the flow of the urine in the ureter.

Ahlberg found bacteriuria in 15 per cent. of pregnant women. Neibel found the urine sterile in only 25 per cent. of cases, demonstrating the presence of streptococci, staphylococci, and colon bacilli. Bacteriologic examination of the urine of all pregnant women should be made. The establishing of the relationship of bacteriuria to eclampsia and nephritis would be valuable.

The majority of patients whom I have seen have presented active symptoms due to infection. If there was drainage, these symptoms were vesical (frequency, burning, painful urination); if drainage was absent, the symptoms were pain in the flank, tenderness in the costo-vertebral angle on one or both sides, and often tenderness in front, and in some cases the kidney could be palpated. When drainage is poor, the patient has an elevation of temperature, which is often associated with a slow pulse.

EXAMINATION AND RESULTS.

Cystoscopic examination of a pregnant woman is seldom difficult. The patient is usually seen between the fourth month and term. The

bladder is flattened from above downward, on account of pressure on the fundus from the enlarged uterus. Enough fluid must be injected into the bladder to elevate the uterus from the trigon, when with a close-vision cystoscope with the beak well depressed, the ureteral orifices are easily distinguished and catheterized. When the ureteral catheter is passed, a moderate amount of pressure may be necessary to advance the catheter on one or both sides. In some cases there is a tendency to an obstruction, and whether due to torsion or kinking of the ureter, or pressure on the ureter, it is found more often on the right than on the left side, and between 10 and 20 cm. from the bladder. When the catheter enters the renal pelvis, there is often a rapid flow of cloudy urine or thick pus, which diminishes in rapidity until it comes down to normal excretion. Complete ureteral obstructions were encountered in the series examined, and demonstrated to be due to calculus, kink, and pressure on the ureter from without. Röntgenograms were taken with catheters in position in certain cases, and in the complete obstructions a thorium injection was made.

In 90 per cent. of the cases observed, the infection was due to the colon bacillus. The bacilli were found on both sides in 75 per cent. of the cases, but in all the infection was more severe on one side than on the other. The kidney function was diminished in all.

A routine pyeloureterogram has not been justifiable, owing to the condition of the patients.

It has been my practice to do as little manipulating as possible in these cases. In the infections the patients are often acutely ill, and no more should be done than is necessary to give immediate relief of the symptoms. This means establishing drainage.

UNUSUAL CONDITIONS, WITH ILLUSTRATIONS.

Several unusual conditions were encountered, and I shall enumerate them briefly.

One patient, a woman aged twenty-six, presented a unilateral chyluria, with no demonstrable lesion. Aside from the presence of a large amount of chyle in the urine from the left kidney, the examination and pyelograms were negative. This condition had been present when she first menstruated and during the puerperium with her two previous children, but had appeared at no other time.

A woman four months pregnant developed pain in the right upper quadrant, and a firm, irregular mass appeared. A catheter was passed into the right renal pelvis, resulting in a rapid discharge of

clear urine, which was free from infection. A pyelogram showed a hydronephrosis. An abdominal exploration revealed a large fibroid attached to the right side of the fundus of the gravid uterus, which pressed on the right ureter. The fibroid was removed, with relief of symptoms, and the patient went to term.

Urgent bladder symptoms during the fourth month of pregnancy were found to be due to a pyelonephritis occurring in a pelvic kidney, in a woman who had previously complained of no urinary symptoms.

Profuse hematuria, localized as unilateral, occurring in a woman five months pregnant, was not relieved by pelvic lavage, but ceased two weeks after the uterus was emptied. Another case of hematuria, the source of bleeding being the left kidney, came under observation when the patient was two months pregnant. Complete urologic examination showed deficient function of this kidney, but no evidence of infection. The patient had a positive Wassermann reaction. The bleeding ceased after the administration of arsphenamin.

Bilateral polycystic kidneys were demonstrated in a patient five months pregnant, who had not previously noticed any urinary or abdominal discomfort.

A ureteral calculus causing ureteral obstruction was found in two cases during pregnancy. In the one, the calculus was passed following cystoscopic manipulation. In the other the calculus was removed, the patient going on to term.

Sharp angulation at the ureteropelvic junction was demonstrated by pyeloureterogram in three cases in which there was a complete blocking of the ureter.

I have drained a perinephritic abscess in two patients immediately following delivery, the infection of the kidney arising during pregnancy, but not being recognized until after confinement.

Pyonephrosis, with an acute infection occurring during pregnancy, and renal calculi have been noted in two cases, in both of which the patients were temporarily relieved by pelvic lavage and were carried to term.

More than 90 per cent. of the cases observed have been acute infections, most marked on one side, occurring during the last three months of pregnancy. The patients were suffering from absorption, high temperature, pain in the side, and urinary symptoms. These patients were all catheterized, given pelvic lavage, and in many the ureteral catheters, one or both, were retained from twenty-four to forty-eight hours. All were relieved and went on to term.

A typical case of this group was a woman, aged twenty-five with a history of good health until this, her first pregnancy. During the first two months she suffered from severe nausea and vomiting, resulting in irregularity of her diet. She remained in bed most of the time, became constipated, and during the third month had a stool only after taking a cathartic, often going three days without an evacuation of the bowels. During the fourth month she developed frequent and burning urination. When I saw her she had had a chill, followed by fever and slight pain in the back, two days later, tenderness in the loin, and more urgent urinary symptoms. Cystoscopic examination showed the bladder intensely congested. There was retention of urine in the left renal pelvis. This urine contained pus and colon bacilli. The kidney function was diminished. The right kidney showed a milder infection. Pelvic lavage, with retention catheters in the kidneys for thirty-six hours, resulted in a drop of temperature from 103° F. to normal, and complete relief of symptoms. The knee-chest position for the relief of pressure for twenty minutes to an hour a day, a second pelvic lavage at the end of three weeks, and careful attention to the gastrointestinal tract, gave lasting relief, and the patient went to full term. Six months after confinement specimens taken from each kidney showed only a diminished function of the left kidney. This woman became pregnant a year later. Most careful attention was given to diet, exercise and bowels from the outset. Once during the third month, slight urinary symptoms appeared, and lavage of the kidney pelvis was given at once, with complete relief. The patient went through this pregnancy with no further complications.

In hospital service, patients often enter the hospital in labor. They seem sicker than normal, and not until after delivery is a renal infection discovered.

Not only is it important for the immediate welfare of the pregnant woman to give her all the relief possible when a renal infection exists, but for her future health. If one takes a complete history of a woman applying for relief of urinary symptoms, very often it is found that the active symptoms date from pregnancy. The possibility of some earlier lesion even from childhood, such as nephritis complicating an infectious disease, or a renal injury, should be ascertained, the existence of which may have rendered the kidney more vulnerable during pregnancy.

The possibility of preëxisting but symptomless disease in the kidney, or of actual lesions as enumerated, giving lowered resistance, may play an important rôle in predisposing to kidney lesions during pregnancy.

Movable kidneys due to poor drainage are particularly prone to infection. A kidney previously normal when congested from the irritation of toxic products from the intestinal tract, and of large

numbers of bacteria, develops a pyelonephritis which may or may not be recognized during pregnancy, but which leaves the organ permanently damaged to a greater or less degree, leading to future trouble. Therefore, not only should lesions be recognized and immediate relief be given to carry the woman through pregnancy, but after the pregnancy she should be observed until the maximum amount of permanent benefit has been derived by palliative or radical measures. Unquestionably many serious kidney lesions of later life will thus be avoided. Once the seat of an infection, a kidney is always more vulnerable. Few women who have gone through a pregnancy have the same general tone as before. Relaxed abdominal muscles, impaired perineal support, greater tendency to constipation from the foregoing causes, and a more sedentary life predispose to future renal infections, and many of the cases of frequency of urination seen women later on in life are but relapses of the old infection or reinfection in kidneys once damaged during pregnancy. How easy it is for a bladder, possibly with weakened support, emptying poorly or subject to pressure from pelvic displacements also secondary to pregnancy, to become infected from the urine from such kidneys, and to cause distressing symptoms for years.

TREATMENT.

The treatment resolves itself, first, into prophylaxis. Such infections may be prevented by impressing on the obstetrician and general practitioner the important rôle of the kidneys during pregnancy. He should go into the history of his patient more carefully, the catheterized urine should be examined bacteriologically as well as chemically, and any variation from a normal condition should be an indication for a complete urologic examination.

Closer attention should be given to the metabolism of the patient, especially in the intestinal tract, thus eliminating as fast as possible the amount of toxic products of intestinal putrefaction thrown on the kidneys, not by the administration of cathartics, but by exercise, diet, and plenty of fluids. This also means diminution in the number of bacteria passing through the kidneys. In this connection, the importance of eliminating focal infections, whether oral, nasal or otherwise, cannot be overestimated.

When a pathologic condition in the urinary tract has been found which might predispose to a kidney infection, it should be eliminated early in pregnancy if possible. Patients as a rule withstand treatment and operation during the early months of gestation with re-

markably little reaction. Whether or not a woman should attempt to go through a pregnancy with a renal lesion present, thus subjecting the kidneys to the added strain and possibly infection, is a question to be decided in each case.

Renal anomalies, tumors, calculi, and infections come under this consideration, and some surgical measure—nephrectomy or nephrotomy—may be advisable at once.

In the presence of such lesions, relief of the kidney to the extent of diminishing its load is certainly indicated, and consists of the most careful attention to details.

When a kidney infection is already present, the indications are to give relief from the toxemia by establishing drainage, and to cut off the supply of toxins and bacteria. This means kidney drainage with the ureteral catheter, retention of the catheter if necessary, lavage of the kidney pelvis, free fluids by mouth, colonic irrigation, and lastly, urinary antiseptics. If relief is not obtained, termination of the pregnancy is to be considered, and, lastly, some operative precedure, such as drainage of the kidney or nephrectomy, if one kidney is the source and relief cannot otherwise be obtained. Following immediate relief, the patient must have the closest attention during the remainder of the pregnancy to prevent a recurrence of the acute infection. A shifting of the intraabdominal pressure gained from the knee-chest position is valuable and all other measures noted in prophylaxis are important.

When a patient has passed through the labor, she should be treated as a urologic patient until all damage has been repaired to its fullest extent by treatment or operative procedures. The possibility of future trouble must always be considered and guarded against.

A partial bibliography of recent contributions bearing on metabolism and kidney function and on the renal complications of pregnancy is appended.

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NEW FORM OF OBSTETRICAL DELIVERY TABLE.[1]

BY

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(With two illustrations.)

An important part of the conduct of a maternity case is the mechanical control of the patient during delivery. In order that an aseptic technic may be carried out, we must secure adequate exposure of the patient, protection of the parts not aseptic and facilities for rapid change of patient's posture. As the existing delivery tables did not give the security and control that we desired, the table about to be described was designed and has been in successful use at the Woman's Hospital for the past two years.

The standard of the table is made of 1½-inch enameled pipe, thus giving both strength and lightness. It is 5 feet long, made of two parallel pipes, the lower 6 inches from the floor, and the upper 12 inches above this. These unite with the upright pipes or legs. At the foot, the legs are continued and connected to the top of the table by hinged joints; making the table 3 feet in height. At the head, the legs stop at the upper of the parallel bars, or 18 inches from the floor. This end of the table is supported from the standard by a ratchet brace. The lower bar at the foot of the table gives firm support for the operator's foot when working at that end of the table. The top is of Monnell metal, 6 feet long and 2 feet in width. This gives ample length to the patient in the recumbent position, and the width is adequate and does not allow the patient to move beyond the operator's reach.

Two inches from the sides and 1½-inches below the top surface, running parallel to the side of the table throughout its length, and attached at the head and foot, is a nickel plated bar 1 inch in diameter which is used as a pulling bar and has the advantage over the rope, sheet, spring chain, etc., of other tables, in that it is stationary and not lost by the patient when let go of. Also, the length does not have to be adjusted for each patient. On this is a sliding ring with strap for fastening the wrist. This allows a free movement of the wrist as the ring slides on the pulling

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bar and thus needs no further adjustment if the patient's position is changed on the table. It does away with the patient's idea that her hands are fastened. A sliding adjustable socket, also attached to the pulling bar, can be moved along the sides of the table. In this fit the shoulder braces which are put in place to keep the patient from shoving up on the table when either in the dorsal, lithotomy or Trendelenburg positions. At the foot of the table are the two leg holder sockets. These are firmly attached to the ends of the table top and not to the sides. This allows the buttocks of the patient to be brought well over the end of the table when in the lithotomy position, without overflexion or abduction of the thighs, thus somewhat relieving the tension on the perineum and giving the operator free space for any manipulation. In these sockets are placed the two adjustable leg holders. Attached to the right side at the foot of the table is a swinging tray, 19 by 13 inches. This tray can be swung in any position from the right side to the foot of the table, and can be used to hold sterile solutions or instruments. It is at the level of the table top and when swung parallel with the foot can be used to lay the baby on after the delivery. This enables us to do away with the possibility of breaking the asepsis by having a pull-up end to the table, which usually becomes unsterile. The sockets for the arm of the tray may be adjusted at such a height, that when the tray is used in that socket it just allows the tray to swing over the operator's knees when sitting at the foot of the table. At the head of the table, on the left side, is another swinging tray 11 by 16 inches used as an anesthetic tray. This may be swung underneath the top of the table or to the side. The Trendelenburg position with a drop at the head of the table up to 18 inches is obtained by the adjustment on the rachet brace.

We feel that we have secured a table simple in design and of useful proportion without the danger of asepsis of an extension piece. It has been possible to readily secure all positions necessary during delivery and especially in the pulling rods with wrist straps, plus the adjustable shoulder braces, have we accomplished a satisfactory method of the controlling the patient.

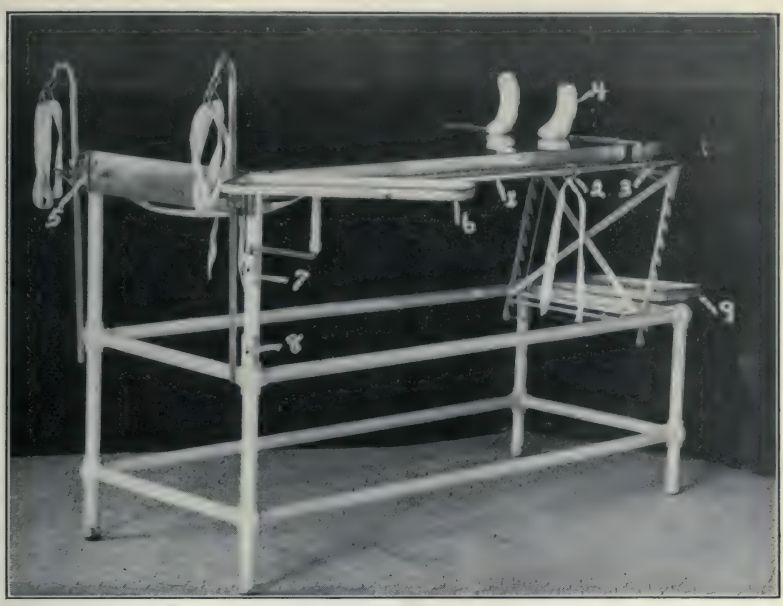

FIG. 1.

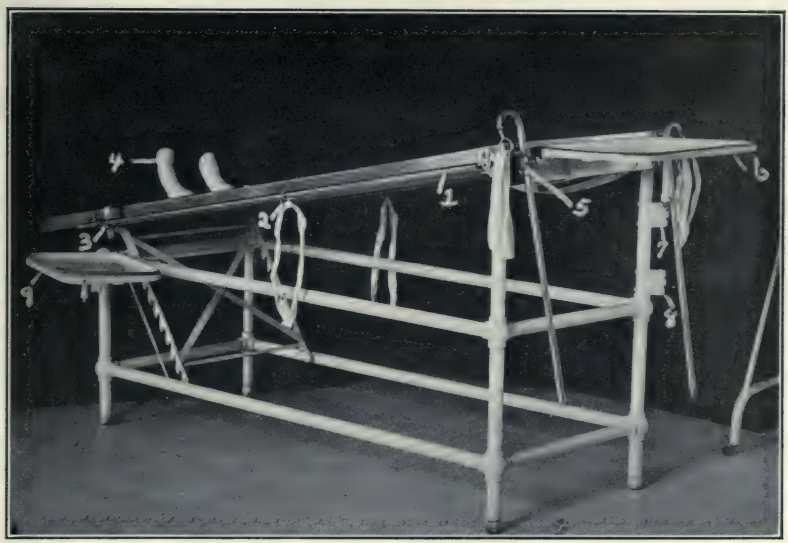

FIG. 2.

INGRAHAM'S DELIVERY TABLE.

EXPLANATION OF FIGURES.

(1) Side bars to which wrist strap with sliding ring (2) is attached. (3) Sliding adjustable socket for shoulder braces (4). (5) Leg holder sockets. (6) Swinging tray with two additional sockets shown at (7) and (8). Anesthetist's tray (9).

THESES CONTRIBUTED BY UNDERGRADUATE FOURTH YEAR STUDENTS AS PART OF THEIR WORK AT THE WOMAN'S HOSPITAL IN THE DEPARTMENT OF GYNECOLOGY, CORNELL UNIVERSITY MEDICAL COLLEGE

SERIES 1919

A STUDY OF URINARY RETENTION FOLLOWING PLASTIC VAGINAL GYNECOLOGICAL OPERATIONS.

BY

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THE following study has been made entirely from the records of the Woman's Hospital covering the period from January, 1918 to May, 1919. The cases have been picked at random from the entire hospital service, ward and private patients, and the work of twenty different surgeons is represented.

The object of this inquiry is to determine from hospital records and statistical study the causes and factors determining the occurrence of postoperative urinary retention, especially in cases of plastic vaginal surgery. From the very nature of a statistical study, it became necessary to review a large number of cases, and, from these, two hundred and one (201) cases were selected from which conclusions might be drawn. Twenty-four (24) of these cases involved abdominal section only. One hundred and seventy-seven (177) cases had some sort of vaginal surgery performed Of these, some were vaginal only and others had a laparotomy as well as vaginal work performed.

In each case, the number of hours of catheterization was noted as well as the total amount of urine obtained by this method. The amount of urine passed in the first twenty-four hours of spontaneous voiding was determined. Certain factors which might influence postoperative retention were noted in all cases. These factors were: (1) the age of the patient; (2) the nature of the operation performed; (3) the individual operator; (4) the time consumed at operation; (5) the condition of the patient as she left the operating room; (6) the severity of the postoperative reaction of temperature, pulse and respiration.

As controls, the twenty-four (24) cases of straight abdominal section were used and each was studied from the same point of view as in studying the vaginal cases, noting the same points. Each one of these points will be considered in order, grouping the cases as they appear in studying each of these possible factors.

I. *Control Cases.*—Twenty-four (24) cases of abdominal section in which no vaginal work was done, representing the work of five different surgeons included not only surgery of the uterus, tubes and ovaries but also nephropexy, gastropexy, appendectomies, cholecystectomy. There is also among these one therapeutic abortion and one case of hemorrhoids with fissure in one. The gynecologic surgery included salpingectomies, oöphorectomies, supravaginal hysterectomies, myomectomies, operations for retroversion, *i.e.*, Simpson ventral suspension, shortening of the round and utero-sacral ligaments. The time of the operations varied between fifteen minutes and two hours and fifteen minutes. Six cases had a postoperative temperature reaction of 102°F. or higher by rectum. Five cases had a postoperative pulse reaction of 120 per minute or higher and in two cases respiration after operation was 36 per minute. Two (2) cases were never catheterized. Twelve (12) cases were catheterized less than forty-eight hours. Two cases were catheterized for 144 hours after operation. The remaining nine cases were catheterized for varying lengths of time between seventy-two and 128 hours.

In none of these cases does catheterization continue beyond the sixth day after operation. More than half void spontaneously within two days.

Never catheterized	8 per cent.
Catheterized less than 48 hours	48 per cent.
Catheterized between 48 ad 144 hours	44 per cent.

II. *Vaginal Cases (with Addition of Interposition Operations).*—Of this type of case, there were 177 examples, representing the work of twenty surgeons. Taking them as a group, without detailing the individual factors in each, there were sixty-five cases which voided spontaneously in less than forty-eight hours. This made up about 36 per cent. of the cases. Seventeen cases voided spontaneously for the first time during the third day after operation. These constituted about 9 per cent. of all the cases. Between the end of the third day and the end of the seventh, fourty.eight cases voided for the first time after operation, making up about 27 per cent. Forty-seven cases, or 26 per cent. were catheterized more than seven days. Some of these cases were catheterized as long as twelve and thirteen days.

Never catheterized	6 per cent.
Catheterized less than 48 hours	30 per cent.
Catheterized 48 to 72 hours	9 per cent.
Catheterized 72 to 168 hours	27 per cent.
Catheterized more than 7 days	26 per cent.

It is seen that 62 per cent. of the cases had retention of urine after the second day and 53 per cent. had retention after the third day. It is to be noted that the type of vaginal operation seems to have little to do with the postoperative retention. Among the cases having retention of less than forty-eight hours are several Watkins interposition operations, Mayo hysterectomies, numerous anterior and posterior colporrhaphies, and thirty-one cystocele operations. From the variety of operations found among those catheterized less than forty-eight hours, it is evident that the type of operation has little to do with the time of postoperative retention. It must be obvious, however, that the length of time of urinary retention in these vaginal cases is markedly greater than that found after straight laparotomy, even though the abdominal section involves hysterectomy or operation for uterine retroversion. Among these vaginal operations, the same operations are about equally distributed through the charts covering retention from the least number of hours through to those exceeding seven days.

III. *Age as a Factor in Postoperative Retention.*—In only 131 of the 177 cases was the age available from the hospital records because of the fact that most of the charts of private cases failed to give the age. Arranged according to decades, the appended chart shows nineteen patients between twenty and thirty years; forty-one between thirty and forty years; forty-five between forty and fifty years; and twenty-six between fifty and sixty years. There seems to be no very clear cut picture drawn by the ages of the patients, but is evident that there is a greater tendency toward retention in the last two decades, *i.e.*, from forty to sixty years of age. Averages are poor criteria by which to judge; and yet, in this case, averages do show the slight tendency toward postoperative retention in the older women. In the third decade of life the average number of hours of retention in the nineteen patients was ninety-one hours, of the fourth decade eighty-eight hours, of the fifth decade ninety-five hours and of the sixth decade 103 hours.

Ages	No. of cases	Average hours of retention
20–30 yrs.	19	91
30–40 yrs.	41	88
40–50 yrs.	45	95
50–60 yrs.	26	103

Age is then a factor though a slight one, in determining the length of time of postoperative retention.

IV. *Time of Operation as a Factor.*—There were forty-seven cases which took two hours or more at operation. Of these, eighteen were catheterized less than forty-eight hours; of the remainder, thirteen voided within seven days after operation. The remaining sixteen were catheterized more than seven days.

Catheterized less than 48 hours	38 per cent.
Catheterized between 48 and 168 hours	28 per cent.
Catheterized more than 7 days	34 per cent.

In view of the fact that in most of these operations there was rather extensive work done and during the long time of operation there is much time for local trauma, there is nothing striking about these figures. The fact that so high a percentage of cases as 34 per cent. had retention over seven days may be explained by the excessive handling locally about the vagina and the trauma caused thereby.

V. *Condition of Patient Leaving Operating Table as a Factor.*—This information was gained from the anesthetist's report at the close of the operation condition was given as "Good," "Fair," "Poor," "Bad." Eleven cases were reported as condition "Fair," one as "Poor," three as "Bad." Those reported as "Bad" had retentions respectively of twenty-eight hours, twenty-three hours, and 224.5 hours. The other cases varied to such a degree that the immediate postoperative condition cannot be held as factor in retention.

VI. *Postoperative Reaction as a Factor.*—Twenty-four cases showed a postoperative temperature of 102° F. or more, rectum, within forty-eight hours. Thirty-four, similarly, had a pulse of 120 or more, and eighteen, similarly had a respiration of thirty or more per minute. None of these showed anything typical in the way of postoperative retention of urine.

VII. *Postoperative Retention in the Services of Different Surgeons.*—Of the 177 cases, 154 were operated on by six surgeons which gives an opportunity to compare the results in the way of postoperative retention in the hands of different operators. As practically all the cases were of a somewhat similar nature, the comparison may justify some conclusion. I designate the operators as A, B, C, D, E, F. Upon examining the appended tabulation, certain conclusions are immediately obvious. It is evident that operators B and E, considering the number of cases belonging to each, have, in general longer retention periods than the other four surgeons. It may also be seen that operators A and C, though each have a small number of

cases, have shorter retention periods than the other four surgeons. Again, finding the retention period average for each operator's cases, we get the following result:

	A	B	C	D	E	F
No. of cases.....	14	27	8	40	17	48
Average hours of retention.....	67.2	131.3	58.2	85.3	132.8	94.4

This would point to the fact that the personal operative technic is a factor in postoperative retention. It has been seen that, taking a large group of cases, the type of vaginal operation makes little difference, that the age of the patient has a slight influence, that the length of time taken at operation is a factor though of lesser importance. In many cases of long drawn-out operations, the local parts receive much handling and suffer much trauma. It is true that certain men take longer for their operative procedure than others, possibly causing more local trauma than the faster, gentler operators. Difference in operative technic and mode of handling the tissues is the only explanation for the fact that in doing the same operations, some surgeons cause less postoperative retention than others. This trauma has its effect naturally on the muscles and other soft parts; but I believe that far more important is its effect on the bladder innervation. The bladder including the sphincter urethræ is supplied by two sets of nerves, (1) the pelvic visceral nerves and (2) the sympathetic from the hypogastric plexus. Both sets of fibers affect the function of the sphincter urethræ though in just what manner and by what mechanism it is difficult to say. Experimental studies are contradictory in that the results vary with the type of animal used, viz., dog, cat and rabbit. It is enough to put down here that there are several factors which enter in. Some of these are: (1) the rate of urinary excretion; (2) the changes in intravesical pressure; (3) the tonic contraction of the sphincter with its innervation; (4) the impulses inhibitory to sphincter tonicity; (5) the detrusor action of the sphincter; (6) the inhibitory impulses to the detrusor action; (7) the impulses for bladder contraction; (8) inhibition of bladder contraction.

It is easy to see how trauma in the vagina may affect the delicate nervous mechanism of micturition. It is as easy to understand how one surgeon may habitually cause more local disturbance especially about the neck of the bladder than another man.

The series of cases would indicate that postoperative retention

is influenced by (1) the operative technic employed and the mode of handling the parts, *i.e.*, vagina and adjacent structures, (2) the length of time of the operation, (3) the age of the patient.

CONCLUSIONS.

1. Vaginal surgery entails longer postoperative catheterization than abdominal surgery.

2. The type of operation done in and about the vagina has no influence on the time of postoperative catheterization.

3. In general, there is slightly longer postoperative retention of urine in women from forty (40) to sixty (60) years of age than in those of the preceding twenty years (20–40).

4. In general, the longer the operation the greater is the tendency to postoperative retention, due possibly to greater exposure of the parts to trauma.

5. The condition of the patient at the close of operation has no influence on postoperative retention.

6. The postoperative reaction of temperature, pulse and respiration is not a factor in postoperative retention.

7. The operative technic, mode of handling the tissues and the trauma inflicted in and adjacent to the vagina and especially about the neck of the bladder on the part of the surgeon is the most important factor in the causation of postoperative urinary retention.

A STUDY OF THE RELATION OF RIGHT ADNEXAL DISEASE TO APPENDICITIS.

BY

MARGARETHA RIBBLE, '19.

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THIS report is based on the study of 110 cases operated at the Woman's Hospital during the first four months of the year 1918. Particular emphasis has been laid on the findings at operation in these cases, and on the pathological reports.

There seems to be five fairly distinct groups of cases giving definite information on this problem. In Group I, forty-three cases, nearly 40 per cent., there is evidence of chronic inflammation in the right adnexa and also hyperemia, dense adhesions or fibrosis in the appendix. There is difficulty here as elsewhere with the histories of the cases. Many are not accessible because they are private patients, and those at hand are rather vague as to the duration of the process and the character of the symptoms.

In Group II, nineteen cases, there are cysts of the right adnexa, without any evidence of infection. With this condition the appendix is in almost every case normal except where the size and location of the adnexal growth has produced hyperemia from stasis and pressure.

Eight cases of right tubal ectopics show the appendix to be affected only when adjacent or contiguous to the tube.

Group III, twenty cases, is composed of those in which the adnexa are normal, but the appendix involved. The histories of these cases, where obtainable, show an entirely different picture from the ones where the appendix is secondarily involved.

On the other hand, Group IV shows thirteen in which the adnexa are involved without the appendix.

In the last ten cases the appendix was reported as retrocecal. This position seems to call for a separate classification because the pathology here may be entirely dependent on the location of the organ.

The operative and pathological findings of the cases follow.

CASES SHOWING ADHESIONS ABOUT RIGHT ADNEXA AND APPENDIX (30).

CASE No. 19999.—Aged twenty-six. Umbilical hernia. Adhesions about both adnexa. Appendix hyperemic.

CASE No. 20066.—Right hydrosalpinx, left intraligamentous cyst. Fibroids. Appdenix adherent and fibrous.

CASE No. 19960.—Aged thirty. Dysmenorrhea. Adhesions about both tubes and ovaries. Fibroids. Appendix adherent.

CASE No. 19907.—Extensive adhesions about right adnexa. Ovarian cyst size of hen's egg. Appendix congested and adherent.

CASE No. 20150.—Both tubes bound by adhesions. Right hydrosalpinx. Appendix congested and bound down at its tip.

CASE No. 20489.—Aged thirty-one. Cramps in lower abdomen two weeks. Adhesions about right adnexa, ovary cystic. Adhesions about left adnexa. Appendix hyperemic, shows round-cell infiltration in the mucosa.

CASE No. 20493.—Adhesions about both adnexa. Large myoma. Few delicate adhesions about appendix.

CASE No. 20505.—Aged twenty-four. Pain in lower abdomen three months. Adhesions about both adnexa. Appendix hyperemic and adherent.

CASE No. 20532.—Adhesions about right adnexa, cystic ovary. Appendix long, in pelvis, fibrosed.

CASE No. 20034.—Adhesions about right adnexa. Varicosities of right broad ligament. Appendix long, retrocecal, adherent, shows obliterating fibrosis.

CASE No. 20150.—Double hydrosalpinx. Appendix hemorrhagic in serosa.

CASE No. 20188.—Mass of adhesions in pelvis. Tubes thickened. Left ovary cystic. Chronic appendicitis.

CASE No. 20220.—Aged twenty. Pain in right lower quadrant. Both tubes adherent and clubbed. Dense adhesions about appendix.

CASE No. 20118.—Adhesions all through pelvis. Right tube and ovary bound down. Appendix obliterated.

CASE No. 20120.—Adhesions about right adnexa. Adhesions about appendix.

CASE No. 20066.—Right hydrosalpinx. Left intraligamentous cyst. Appendix adherent and fibrous.

CASE No. 20072.—Right ovary large and cystic with adhesions. Appendix slightly congested.

CASE No. 20080.—Right tube adherent to sigmoid, ovary cystic.

CASE No. 20092.—Right tube clubbed and tortuous. Appendix stringy, obliterated by fibrosis.

CASE No. 20333.—Dense adhesions all through pelvis. Right ovary cystic. Appendix obliterated.

CASE No. 20234.—Both tubes thick and adherent. Appendix intensely hyperemic.

CASE No. 20309.—Tubes and ovaries adherent. Appendix long and hyperemic.

CASE No. 20325.—Few adhesions about tubes. Appendix obliterated.

CASE No. 20251.—Adhesions about both tubes, ovaries small and sclerotic. Appendix not adherent, tip obliterated.

CASE No. 20254.—Adhesions about right ovary. Appendix adherent to base of cecum.

CASE No. 20330.—Aged twenty-one. Pain in left lower quadrant two months. Adhesions all through pelvis, omentum thick. Appendix adherent and nodular at base. Tubes show typical miliary tubercles, no microscopic report on appendix.

CASE No. 20045.—Aged thirty-five. Tuberculosis of both tubes. Appendix thickened, shows increase in lymphoid tissue.

CASE No. 20574.—Aged thirty-three. Pain in left lower quadrant.

White watery discharge. General adhesions, tubes free, show tuberculosis. Appendix in a mass of adhesions, very pale, no microscopic report.

CASE No. 20414.—Aged twenty. Double tubercular salpingitis. Appendix shows no gross change, no pathological report on appendix.

RIGHT ADNEXAL DISEASE SHOWING PUS (14).

CASE No. 20124.—Both tubes thickened, small amount of pus present, gonococci demonstrated. Appendix adherent, microscopically shows round cells in the subserosa.

CASE No. 20429.—Right pyosalpinx. Appendix situated with tip on tube. Periappendicitis.

CASE No. 20440.—Aged twenty-eight. Pain in right lower quadrant eight days. Bilateral purulent salpingitis. Bilateral oöphoritis. Adhesions about appendix.

CASE No. 20442.—Aged twenty-nine. Metrorrhagia two weeks. Acute bilateral salpingitis. Appendix congested in the serosa.

CASE No. 20536.—Adhesions about right tube, ovary cystic. Pus in tube. General hyperemia of appendix.

CASE No. 20545.—Double pyosalpinx. Appendix adherent in pelvis, shows round-cell infiltration in muscularis. Adnexa normal.

CASE No. 20581.—Appendix hyperemic.

CASE No. 20124.—Tubes thickened, some pus present, gonococci shown. Appendix adherent, round cells in subserosa.

CASE No. 20139.—Temp. 100°. No gonococci in smears. Bilateral pyosalpinx with adhesions. Tip of appendix in adhesions, shows round cells in serosa.

CASE No. 20141.—Double pyosalpinx. Adhesions about appendix, no pathological changes.

CASE No. 20345.—Double purulent salpingitis. Appendix adherent and serosa infected.

CASE No. 20226.—Double pyosalpinx. Appendix normal, not removed.

CASE No. 20021.—Double pyosalpinx, adhesions to small intestine. Appendix enlarged (?) not pathological.

CASE No. 20026.—Mass of adhesions among pelvic organs. Large right pyosalpinx. Tip of appendix buried behind tube, thickened.

CYSTS OF RIGHT ADNEXA (19). GROUP II.

CASE No. 19978.—Cyst of right ovary. Appendix normal.

CASE No. 19946.—Cyst of right ovary. Appendix normal.

CASE No. 20490.—Cyst of right ovary. Appendix normal.

CASE No. 20467.—Aged twenty-eight. Lump in abdomen two years. Cyst of right ovary, tube normal, fibroids. Appendix congested in the serosa. (Probably from stasis caused by pressure of fibroid.)

CASE No. 20473.—Cyst of right ovary. General hyperemia of appendix.

CASE No. 20475.—Cyst of right ovary. Appendix normal.

CASE No. 20520.—Cysts of both ovaries. Appendix normal.

CASE No. 20497.—Both ovaries cystic. Large myoma. Appendix normal.

CASE No. 20002.—Right intraligamentous cyst. Appendix adherent to broad ligament shows edema of mesentery.

CASE No. 20543.—Dermoid cyst of right ovary. Appendix normal.

CASE No. 20563.—Follicular cysts of both ovaries. Appendix infected and edematous, shows round cells in serosa.

CASE No. 20063.—Cyst of right ovary. Appendix normal.

CASE No. 20577.—Aged twenty-eight. Pain in right lower quadrant. Severe attacks. Papillary serous cystoma of right ovary with twisted pedicle. Tubes normal. Appendix long and adherent, shows general hyperemia.

CASE No. 20583.—Large cyst of right ovary filling abdomen. Appendix normal, not removed.

CASE No. 20594.—Bilateral cystic carcinoma of ovaries. Appendix normal.

CASE No. 20596.—Right parovarian cyst. Appendix has hemorrhages in submucosa.

CASE No. 20182.—Right ovary cystic. Appendix congested in serosa.

CASE No. 20133.—Right ovary cystic, both tubes hyperemic. Appendix hyperemic.

CASE No. 20068.—Cyst of right ovary. Retroversion. Mucosa of appendix fibrosed.

RIGHT TUBAL ECTOPICS (8).

CASE No. 19969.—Right tubal ectopic, abdomen full of blood. Appendix adherent to right tube, microscopically shows hyperemia and round cells in the subserosa.

CASE No. 19969.—Right tubal ectopic. Appendix adherent to tube, shows edema of subserosa and round-cell infiltration.

CASE No. 20184.—Right tubal ectopic. Appendix normal.

CASE No. 20198.—Right tubal ectopic. Appendix normal.

CASE No. 20134.—Right tubal ectopic. Appendix normal.

CASE No. 20146.—Right tubal ectopic. Appendix retrocecal and adherent.

CASE No. 20340.—Right tubal abortion. Appendix inflamed shows round cells.

CASE No. 20012.—Right tubal ectopic. Appendix long and adherent to tube, intensely red.

CASES HAVING APPENDICITIS ONLY (20). GROUP III.

CASE No. 19912.—Adnexa normal. Phlegmonous appendicitis. W. B. C. 26,000; Polys. 90 per cent.; Temp. 98.6°.

CASE No. 19940.—Double femoral hernia. Adnexa normal. Appendix obliterated by fibrosis.

CASE No. 20519.—Adnexa normal. Retroverted uterus. Appendix long, low in pelvis, fibrosed.

CASE No. 20540.—Right adnexa normal. Left adnexa adherent. Appendix obliterated by fibrosis.

CASE No. 20541.—Both adnexa normal. Appendix kinked and hyperemic.

CASE No. 20557.—Appendix obliterated by fibrosis. Ovaries cirrhotic.

CASE No. 20037.—Adnexa normal. Appendix long, serosa hyperemic.

CASE No. 20576.—Aged nineteen. C. C. Convulsions. Adnexa normal, retroversion. General hyperemia of appendix.

CASE No. 20581.—Adnexa normal. Appendix hyperemic and contains pus.

CASE No. 20100.—Aged twenty-nine. Pain over McBurney's point five days. Appendix congested. Small myoma. Right ovary large.

CASE No. 20189.—Aged twenty-six. Dysmenenorrhea for four months. Acute pain in right lower quadrant two weeks ago. Uterus and adnexa normal. Appendix large and congested, fine adhesions, some pus in lumen, round cells in subserosa.

CASE No. 20108.—Right adnexa normal. Left ovary has lutein cyst, tube hyperemic. Appendix hyperemic and round cells in mesoappendix.

CASE No. 20239.—Adnexa normal. Appendix hyperemic, contains fecolittis.

CASE No. 20244.—Adnexa normal. Retroversion. Appendix hyperemic.

CASE No. 20307.—Adnexa normal, general visceroptosis. Appendix long, hyperemia of mucosa.

CASE No. 20288.—Adnexa normal. Fibroids. Appendix in pelvis and inflamed at tip.

CASE No. 20291.—Adnexa normal. Adhesions about appendix, general hyperemia.

CASE No. 20292.—Right adnexa normal, myoma. Adhesions about appendix.

CASE No. 20259.—Adnexa normal. Adhesions about appendix.

CASE No. 20266.—Adnexa normal. Appendix atrophic and tightly adherent to side of cecum.

RIGHT ADNEXAL DISEASE WITHOUT APPENDICITIS (13). GROUP IV.

CASE No. 199951.—Aged twenty-four. Pain in lower abdomen four months. Adhesions about both adnexa. Appendix normal.

CASE No. 20101.—Adhesions about both adnexa. Tubes clubbed. Appendix normal.

CASE No. 20090.—Adhesions about adnexa, myoma. Appendix normal.

CASE No. 20302.—Right salpingitis and ovarian cyst. Left hydrosalpinx. Appendix normal.

CASE No. 20294.—Dense adhesions about both adnexa, fibroids. Appendix normal.

CASE No. 20263.—Adhesions about right adnexa. Appendix normal.

CASE No. 20548.—Adhesions about right adnexa, tube closed. Appendix normal.

CASE No. 20055.—Adhesions about right tube. Left hydrosalpinx. Fibroids. Appendix normal.

CASE No. 20060.—Adhesions about both adnexa, retroversion. Appendix normal.

CASE No. 20062.—Adhesions all through pelvis. Fibroids. Left hydrosalpinx. Right ovary sclerotic. Appendix normal.

CASE No. 20199.—Adhesions about both tubes. Appendix normal.

CASE No. 20205.—Adnexa thickened, no adhesions. Appendix normal.

CASE No. 20243.—Both tubes thickened. Appendix normal.

APPENDIX RETROCECAL (10). GROUP V.

CASE No. 19983.—Adhesions about right tube and ovary. Appendix retrocecal, no pathological change.

CASE No. 19994.—Small cyst of right ovary. Appendix retrocecal, edematous and hyperemic.

CASE No. 19962.—Multiple cysts of right ovary. Appendix retrocecal and hyperemic.

CASE No. 20472.—Aged twenty-eight. Pain left lower quadrant. Cystoma of right ovary. Prolapse of left ovary with adhesions. Appendix retrocecal, not pathological.

CASE No. 20528.—Right ovarian cyst, fibromata. Appendix retrocecal, deeply buried, not pathological.

CASE No. 20504.—Adhesions about both adnexa. Appendix retrocecal, not pathological.

CASE No. 20003.—Right adnexa normal. Left adnexa adherent. Appendix retrocecal and adherent.

CASE No. 20192.—Right hydrosalpinx, right ovary cystic and adherent. Appendix retrocecal and adherent at tip. Pathology normal.

CASE No. 20143.—Appendix, retrocecal and adherent, the mucosa is fibrosed. Right ovary cystic.

CASE No. 20282.—Adhesions about right tube. Appendix retrocecal, adherent, not pathologic.

In drawing conclusions from these cases allowance must be made for several facts. In the first place the location of the appendix was not always stated by the surgeon, so that it is not known whether it was actually involved by contiguity or by hematogenous or lymphatic extension. In the second place the pathological report was not always made on the appendix so that there may have been cell changes not demonstrable in the gross.

Deaver, in his "Applied Anatomy," says that the appendiculo-

ovarian ligament, a rather indefinite fold of peritoneum extending from the broad ligament to the mesoappendix and carrying lymphatics and small blood-vessels, is supposed by some to be the path of infection, but this has never been proved.

The facts standing out from the above study may be summarized as follows:

Group I (38 per cent. of the cases) seems to show that there is a definite relationship between chronic inflammation of the right adnexa and a chronic inflammatory process in the appendix, but owing to a lack of definite information in the record, it is impossible to conclude whether the inflammation travels by contiguity or indirectly by the blood and lymph channels.

Group II (16 per cent. of the cases) right adnexal cysts, seems to indicate that the appendix is normal where there is no adnexal infection, unless pressure from the cyst has caused stasis. The cases of ectopics in the right tube show inflammation in the appendix only when it is touching the involved area.

Group III (17 per cent.) of cases of acute and subacute appendicitis in which the adnexa were normal, have a different type of history from the ones in which the appendix was secondarily affected. They show the appendicitis to be an independent process.

Group IV, though a small per cent. (10 per cent.) of cases contradicts Group I in that the adnexa show definite evidence of chronic inflammation and the appendix is reported normal. Perhaps if the microscopic pathology of the appendix had been studied, beginning changes would have been found in its cellular structure.

Group V, 8 per cent., where the appendix was retrocecal, the pathology, if present, seemed to be due entirely to mechanical position.

My personal conclusion is that the appendix is affected from right adnexal disease only when in actual contact with the inflammatory process, the inflammation spreading slowly by way of the peritoneum, and the appendix, a rudimentary organ, offering a vulnerable point of attack.

A STUDY OF POSTOPERATIVE VOMITING IN ABDOMINAL GYNECOLOGICAL OPERATIONS.

BY

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THE main purpose of this study was to ascertain the normal limit of "ether" vomiting following abdominal operations. A series of 189 records at the Woman's Hospital of cases operated on by four attending surgeons (with their assistants) was reviewed. Incidentally an attempt was made to determine causes and the most effective treatment of troublesome vomiting. The operations were almost entirely confined to the female pelvic organs (suprapubic, usually with the addition of appendectomy and vaginal work, see General Table). All surgeons had an apparently even share of difficult and easy operations, except that one surgeon had many more than any one of the others. It is to be noted that all the cases underwent preoperative and postoperative care in accordance with the standardized orders of the Woman's Hospital.

The findings were arranged, first, in a general table under various headings (see General Table 1), and from this several factors were subsequently tabulated (see Tables II, III, IV). It soon became evident that, with the exception of the diminished likelihood of vomiting in cases of shock, such facts as preoperative and postoperative condition, etc., were of little value, and were, therefore, in the main omitted in uncomplicated cases.

The tables are practically self-explanatory, and the following conclusions seem evident.

1. The normal limit of "ether" vomiting is in the vicinity of forty-eight hours (third day) after operation.

2. About twenty-five per cent. (25 per cent.) of uncomplicated operative cases do not vomit at all.

3. The operator's technic may have some influence on the length of postoperative vomiting (probably the amount of handling of viscera).

4. The duration of the operative procedure may have some influence on the vomiting.

5. Vomiting is practically a constant positive symptom of ileus, acidosis, and peritonitis.

6. Vomiting may be the only positive sign of septic peritonitis.

7. Gastric lavage is invariably effective in controlling an uncomplicated case of troublesome vomiting, and hot water by mouth seems to act like gastric lavage.

TABLE II.

Total number of cases studied	189
Total number of cases requiring gastric lavage	20
Number of latter that ended fatally	7
Fatal vomiting cases divided into:	
Sepsis	5
Par. ileus	1
Carcinoma	1
Fatalities without vomiting (shock)	2
Cases requiring no special treatment (see table below)	167

III. TABLE OF CASES REQUIRING NO SPECIAL TREATMENT FOR VOMITING TO INDICATE NORMAL LIMIT OF VOMITING AND COMPARISON OF EACH OPERATOR'S RECORD

Operator	*A*		*B*		*C*		*D*		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Number of cases who did not vomit at all	5	13.8	19	26.8	8	24.2	9	36	41	24.6
Number of cases who did not vomit after 1st day	12	32.4	33	46.4	10	30.3	3	12	58	34.9
Number of cases who did not vomit after 2d day	10	27	11	12.7	11	33.3	8	32	40	24
Number of cases who did not vomit after 3d day	6	16.2	4	5.6	2	6	3	12	15	9
Number of cases who did not vomit after 4th day	2	5.4	3	4.2	1	3	1	4	7	4.2
Number of cases who did not vomit after 5th day	2	5.4	1	0.5	0	...	1	4	4	2.4
Number of cases who vomited after 5th day					1	3			1	0.6
Total for each operator	37		71		33		25		Total for all operations 166	
Total per cent. of cases who did not vomit after 20th day	73.2		85.9		87.8		80		83.5	
Total per cent. of cases who did not vomit after 30th day	89.4		91.5		93.8		92		92.5	
Total per cent. of cases who vomited after 30th day	10.8		4.7		6		8		7.2	

IV. TABLE OF RELATION BETWEEN TIME OF OPERATION AND DURATION OF VOMITING

	Oper. time < 1 hr. 30 m.		Oper. time < 1 hr. 30 m.	
	No.	%	No.	%
Cases who did not vomit at all	13	24	6	20
Cases who did not vomit after 1st day	17	31.4	12	40
Cases who did not vomit after 2d day	12	22.2	4	13.3
Cases who did not vomit after 3d day	9	16.6	1	3.3
Cases who did not vomit after 4th day	0	....	4	13.3
Cases who did not vomit after 5th day	1	1.8	1	3.3
Cases who vomited after 5th day	2	3.7	2	6.6
Total per cent. of cases who did not vomit after 2d day	77.6		73.3	
Total per cent. of cases who did not vomit after 3d day	94.2		76.6	
Total per cent. of cases who vomited after 3d day	5.5		23.2	

IN MEMORIAM.

DOCTOR THOMAS ADDIS EMMET.

1828–1919.

AN APPRECIATION.

On March first of the present year there passed from our midst and earthly sight the mortal embodiment of a man of distinction, a scientist, a scholar, and a patriot: Dr. Thomas Addis Emmet. The lesson of his life is now completely written—the radiant glimpse of new achievement, the persistent, unswerving devotion to an ideal and the final triumph in success. The records of his deeds speak his praise. To Marion Sims and Thomas Addis Emmet the medical opinion of the world has accorded the honor of being the originators and founders of modern surgical gynecology. Dr. Emmet devoted himself almost exclusively to the field of plastic surgery and was regarded as the highest embodiment of the skill of his time. He was tireless in his devotion to his work and its many details. When he had acquired a clear conception of the principles involved in a surgical procedure for the repair of an injury, infinite patience and industry were applied to its final accomplishment, learning by his failures as well as his successes. In the extended field of original research with which Dr. Emmet's name is connected, his greatest claim for fame rests on his work on the pathology of lacerated cervix uteri and its surgical treatment, childbed injuries to the pelvic floor and their repair, and a procedure for the relief of procidentia uteri. In addition we have a record which includes the perfection of the technic of manifold gynecological procedures and the contribution to the armamentarium of this branch of valuable original instruments. Many of the latter under somewhat modified form are still in daily use and considered quite indispensable. Dr. Emmet displayed his scholarly attainments in the clarity of his writings, the graphic word pictures of his operations, his pointed anecdotes and his engaging conversation.

From the *American Journal of Obstetrics*, April, 1919.

As a lover of his country and a patriot, no loyalty could surpass his zeal and devotion in perfecting the records of the American Declaration of Independance. Into this undertaking he applied the same indomitable perseverance that brought him success in his profession. The task he set for himself was to secure an indisputable, authentic dup'icate of every signature that adorns the immortal document. With infinite pains, almost inexhaustible correspondence and personal investigation he sought out the descendants of the signers and rummaged through their letters and family archives until his search was rewarded. This work interested him after his professional activities had ceased and undoubtedly was an agency in prolonging his life—another convincing argument for the beneficence of a fad.

The numerous writings of Dr. Emmet attest his industry in his chosen field and his long and active association with the Woman's Hospital afforded him the opportunity to become one of the leaders in American gynecology. His life was a long and active one as shown not only by his professional labors but also his close association with our leading medical societies. He was one of the founders of the American Gynecological Society and had the honor to read the first paper at its opening meeting. He was also one of the founders of the New York Obstetrical Society and a long and active participant in its meetings. Honored both here and abroad in many ways, his life was ended in retirement that was most congenial to his literary tastes and inclinations. His name stands high in the roster of the leaders of American medicine and the stimulus accorded to the development of gynecology throughout the world can to a large degree be traced to his individual efforts and influence.

J. Riddle Goffe, M. D.

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W Woman's Hospital in the State of New York
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